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“Not an Idea We Have to Shun”: Chinese Overseas Basing Requirements in the 21st Century

by Christopher D. Yung and Ross Rustici

with Scott Devary and Jenny Lin



Center for the Study of Chinese Military Affairs
Institute for National Strategic Studies
National Defense University

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Cover photo: Pakistan and Chinese navy ships during joint maritime exercise in Arabian Sea, November 24, 2005. Pakistan and China hold naval exercises, particularly in nontraditional security fields to strengthen their defense capability and enhance professional skills
(AP Photo/Inter Services Public Relations/HO)

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Executive Summary

China's expanding international economic interests are likely to generate increasing demands for its navy, the People's Liberation Army Navy (PLAN), to operate out of area to protect Chinese citizens, investments, and sea lines of communication. The frequency, intensity, type, and location of such operations will determine the associated logistics support requirements, with distance from China, size and duration, and combat intensity being especially important drivers.

How will the PLAN employ overseas bases and facilities to support these expanding operational requirements? The assessment in this study is based on Chinese writings, comments by Chinese military officers and analysts, observations of PLAN operational patterns, analysis of the overseas military logistics models other countries have employed, and interviews with military logisticians. China's rapidly expanding international interests are likely to produce a parallel expansion of PLAN operations, which would make the current PLAN tactic, exclusive reliance on commercial port access, untenable due to cost and capacity factors. This would certainly be true if China contemplated engaging in higher intensity combat operations.

This study considers six logistics models that might support expanded PLAN overseas operations: the Pit Stop Model, Lean Colonial Model, Dual Use Logistics Facility, String of Pearls Model, Warehouse Model, and Model USA. Each model is analyzed in terms of its ability to support likely future naval missions to advance China's expanding overseas economic, political, and security interests and in light of longstanding Chinese foreign policy principles. This analysis concludes that the Dual Use Logistics Facility and String of Pearls models most closely align with China's foreign policy principles and expanding global interests.

To assess which alternative China is likely to pursue, the study reviews current PLAN operational patterns in its Gulf of Aden counterpiracy operations¹ to assess whether the PLAN is currently pursuing one model over the other and to provide clues about Chinese motives and potential future trajectories. To ensure that this study does not suffer from faulty assumptions, it also explicitly examines the strategic logic that Western analysts associate with the String of Pearls Model in light of the naval forces and logistics infrastructure that would be necessary to support PLAN major combat operations in the Indian Ocean. Both the contrasting inductive and deductive analytic approaches support the conclusion that China appears to be planning for a relatively modest set of missions to support its overseas interests, not building a covert logistics infrastructure to fight the United States or India in the Indian Ocean.

Key findings:

- There is little physical evidence that China is constructing bases in the Indian Ocean to conduct major combat operations, to encircle India, or to dominate South Asia.
- China's current operational patterns of behavior do not support the String of Pearls thesis. PLAN ships use different commercial ports for replenishment and liberty, and the ports and forces involved could not conduct major combat operations.
- China is unlikely to construct military facilities in the Indian Ocean to support major combat operations there. Bases in South Asia would be vulnerable to air and missile attack, the PLAN would require a much larger force structure to support this strategy, and the distances between home ports in China and PLAN ships stationed at the String of Pearls network of facilities along its sea lines of communication would make it difficult to defend Chinese home waters and simultaneously conduct major combat operations in the Indian Ocean.
- The Dual Use Logistics Facility Model's mixture of access to overseas commercial facilities and a limited number of military bases most closely aligns with China's future naval mission requirements and will likely characterize its future arrangements.
- Pakistan's status as a trusted strategic partner whose interests are closely aligned with China's makes the country the most likely location for an overseas Chinese military base; the port at Karachi would be better able to satisfy PLAN requirements than the new port at Gwadar.
- The most efficient means of supporting more robust People's Liberation Army (PLA) out of area military operations would be a limited network of facilities that distribute functional responsibilities geographically (for example, one facility handling air logistics support, one facility storing ordnance, another providing supplies for replenishment ships).
- A future overseas Chinese military base probably would be characterized by a light footprint, with 100 to 500 military personnel conducting supply and logistics functions. Such a facility would likely support both civilian and military operations, with Chinese

forces operating in a restrictive political and legal environment that might not include permission to conduct combat operations.

- Naval bases are much more likely than ground bases, but China might also seek to establish bases that could store ordnance, repair and maintain equipment, and provide medical/mortuary services to support future PLA ground force operations against terrorists and other nontraditional security threats in overseas areas such as Africa.
- A more active PLA overseas presence would provide opportunities as well as challenges for U.S.-China relations. Chinese operations in support of regional stability and to address nontraditional security threats would not necessarily conflict with U.S. interests and may provide new opportunities for bilateral and multilateral cooperation with China.
- Long-term access to overseas military facilities would increase China's strategic gravity and significantly advance China's political interests in the region where the facilities are located. To the extent that U.S. and Chinese regional and global interests are not aligned, the United States would need to continue to use its own military presence and diplomatic efforts to solidify its regional interests.
- A significantly expanded Chinese military presence in the Indian Ocean would complicate U.S. relations with China and with the countries of the region, compel U.S. naval and military forces to operate in closer proximity with PLA forces, and increase competitive dynamics in U.S.-China and China-Indian relations.
- Finally, if some of the countries of the Indian Ocean region and elsewhere agree to host PLA forces over the long term, their decision will imply a shift in their relations with the United States, which may ultimately need to rethink how it engages and interacts with these countries.

Introduction

This is the second report by the Center for the Study of Chinese Military Affairs assessing the future trajectory of China's out of area naval operations. A December 2010 report used case studies of past Chinese operations, considered how other navies conducted out of area operations, identified obstacles that all navies confronted in operating out of area, and analyzed possible solutions the People's Liberation Army Navy (PLAN) may undertake to

conduct out of area operations more effectively.² This report focuses on the logistics requirements for PLAN overseas operations in support of China's expanding global interests and the facilities and basing arrangements the PLAN might employ to support these missions over the next 25 years.

This report is organized in five sections. The first section examines China's expanding international economic interests, which are likely to generate increasing demands for the PLAN to operate out of area to protect Chinese citizens, investments, and sea lines of communication (SLOCs). The second section establishes six alternative logistics and support models the PLAN could potentially use to support its expanded operations. It evaluates each model against Chinese foreign policy and national security interests and then considers its compatibility with established Chinese foreign policy principles. This section employs a deductive approach: assessing China's future overseas interests and likely military operations and then identifying which basing/access arrangements would best support those interests. The next section approaches the same issue with an inductive approach, examining potential basing/access arrangements through the prism of Chinese activities in the Indian Ocean and the operational patterns of Chinese military behavior in current out of area operations.

The fourth section takes a closer look at the supposed strategic rationale for the String of Pearls alternative and asks several questions: If China were intent on conducting major combat operations in the Indian Ocean and elsewhere, what force structure and logistics infrastructure would be necessary? What indicators would be present if China were to embark on this path? Are there indications that this is taking place? Would the Chinese consider this a sound strategic option?

The fifth section draws on interviews with U.S. military logisticians and Chinese writings to assess how China might implement logistics support arrangements that involve an overseas logistics support base, including speculation about potential base sites.

The conclusion explores the strategic implications of the analysis. What do these findings suggest the United States should do with regard to its relationship with the other countries of South Asia and the Indian Ocean region (IOR)? What do these findings suggest about the future of the U.S. relationship with China? What activities should the United States military engage in, given the presence of Chinese military forces in facilities in the Indian Ocean and elsewhere? What do the findings of this report suggest about China's future ambitions as a global or regional military power?

China's Overseas Interests, Missions, and Likely Base and Facilities Support Requirements

Observers of Chinese foreign policy have long asserted that Chinese international economic interests are expanding and that its foreign policy and security interests will inevitably follow.³ The growth in China's global economic ties over the past decade has been dramatic. The desire of foreign firms to tap inexpensive Chinese labor and access the Chinese market produced a flow of foreign direct investment into China in the 1980s and 1990s, building new production networks that integrated China into the regional and global economy. China's trade ties with both suppliers and markets grew rapidly as production of many goods relocated to sites in China. Over the last decade, Chinese state-owned enterprises and private companies have become significant international actors in their own right, making international investments to build factories and develop energy and mineral resources, acquiring foreign firms, and building major infrastructure projects everywhere from Latin America to Southeast Asia.⁴ This activity has increased China's overseas economic presence and made its domestic growth—and thus its internal stability—dependent on the ability to access global markets and resources.

From 2003 to 2014, Chinese foreign trade nearly quintupled, growing from \$851 billion to more than \$4.16 trillion. China became a major exporter to developed country markets in North America and Europe and also to developing countries in Africa, Latin America, and the Middle East. At the same time, China began to import large volumes of oil and natural gas (surpassing the United States as the world's largest oil importer in September 2013).⁵ The Chinese economy also imported large quantities of minerals, metals, foodstuffs, and other natural resources, becoming the most important driver of a global boom in commodity prices. Chinese imports from resource-rich countries in Africa, Latin America, North America, and the Middle East grew even faster than China's overall trade, producing a new dependence on the maritime trade routes that connect China to regions outside Asia. In 2011, more than 60 percent of China's trade traveled by sea.⁶

Trade is not the only dimension of China's growing international presence. Chinese companies have become major investors in Asia, Africa, Latin America, and Europe. Official data indicates that the cumulative total of Chinese outbound investment grew from approximately \$33.2 billion in 2003 to more than \$531.9 billion in 2012. Chinese government data shows that as of 2012, Chinese companies had invested more than \$21.7 billion in Africa, \$68.2 billion in Latin America, and \$25.5 billion in North America.⁷ The Heritage Foundation/American

Enterprise Institute “China Global Investment Tracker,” which captures the final destination of Chinese investment with more precision than official government data, shows even higher totals of Chinese investment outside Asia.⁸

While Chinese foreign direct investment in overseas factories, mines, and energy projects is an important and growing national interest, it also involves a significant increase in Chinese expatriates living and working abroad, particularly in the developing countries of sub-Saharan Africa. Erica Downs of the Brookings Institution testified in April 2011 that:

*[t]he expansion of Chinese companies around the world has increased the number of Chinese citizens working overseas, including in countries with elevated levels of political risk. The number of Chinese working abroad is estimated to have increased from 3.5 million in 2005 to 5.5 million today. This has prompted China’s foreign policy establishment to step up its efforts to ensure the safety of Chinese citizens overseas.*⁹

In addition to the 5.5 million Chinese citizens working abroad, more than 60 million travel overseas every year. Protecting these citizens—or evacuating them if the political or security environment becomes unstable—has become an increasingly important and politically sensitive task for the Chinese government. Mathieu Duchâtel and Bates Gill note that between 2006 and 2010, “a total of 6000 Chinese citizens were evacuated from upheavals in Chad, Haiti, Kyrgyzstan, Lebanon, Solomon Islands, Thailand, Timor-Leste and Tonga.” In 2011 alone, “China evacuated a staggering 48,000 of its citizens from Egypt, Libya and Japan.”¹⁰ Both PLA Navy and PLA Air Force (PLAAF) units deployed to assist in the evacuation of Chinese citizens from Libya.

These trends are likely to continue, albeit at a slower pace, as the Chinese government tries to rebalance the Chinese economy to rely more on domestic consumption to drive economic growth. China’s dependence on imported food, minerals, metals, and especially energy will also continue to deepen. China currently imports about 6.2 million barrels of oil a day, mostly from the Middle East and Africa. This figure is projected to rise to 13 million barrels a day by 2035.¹¹ Despite government efforts to improve energy efficiency and diversify supplies of oil and natural gas, a recent study by the State Council’s Development Research Center concluded that by 2030, China might import 75 percent of its oil and that dependence on overseas natural gas will also rise rapidly. The director of the center warned that “rising risk for the energy transportation routes will pose new challenges which will be directly affected by geopolitical risks in the

neighboring regions, the Middle East and Africa.”¹² China is constructing oil and natural gas pipelines from Kazakhstan, Russia, and Burma to mitigate some potential transport risks, but it will remain heavily dependent on seaborne oil and liquefied natural gas supplies from the Middle East and Africa. Andrew Erickson and Gabriel Collins conclude, “In the end, pipelines are not likely to increase Chinese oil import security in quantitative terms, because the additional volumes they bring in will be overwhelmed by China’s demand growth; the country’s net reliance on seaborne oil imports will grow over time, pipelines notwithstanding.”¹³

Expanding Interests, Expanding Missions

Chinese civilian leaders have called upon the PLA to play a greater role in protecting China’s overseas interests. Then-General Secretary Hu Jintao used a 2004 speech to the Central Military Commission to give the PLA four “New Historic Missions.” Daniel Hartnett summarized them: “to ensure military support for continued Chinese Communist Party (CCP) rule in Beijing; to defend China’s sovereignty, territorial integrity, and national security; to protect China’s expanding national interests; and to help ensure a peaceful global environment and promote mutual development.”¹⁴ The third mission gives the PLA new responsibilities to help protect China’s overseas economic, political, and security interests. Examples include PLAN participation in counterpiracy missions in the Gulf of Aden since 2008 and PLAN and PLAAF efforts to evacuate People’s Republic of China (PRC) citizens from Libya in 2011.

Chinese officers and scholars have begun writing openly about how expanding interests abroad require a greater PLA role to protect those overseas interests and recommending that the Chinese leadership consider establishing bases overseas. Retired PLAAF Colonel Dai Xu writes:

*China is the world’s number-one or number-two importer of crude oil and mineral markets. At the same time, China is a major exporter of textiles, toys, and other goods. This import-export trade is primarily dependent upon maritime transport, yet these sea routes are full of incredibly perilous factors. . . . Looking at the example of the Middle East, which supplies over half of China’s oil imports, Chinese oil transport vessels traveling from that region must pass through the Persian Gulf, the Indian Ocean, the Strait of Malacca, and the South China Sea. Danger is everywhere in the Persian Gulf, pirates run amok on the Indian Ocean, and the navies of India and the United States eye our vessels jealously. The power of various countries crisscrosses the Strait of Malacca and the South China Sea, and pirates also hunt these areas.*¹⁵

He goes on to note:

[a]nother aspect is that, following the growth of China's foreign exchange reserves and the expansion of foreign investment, the amount of Chinese-held fixed assets overseas will become increasingly larger. Incidents in recent years of Chinese oil workers being kidnapped in Africa and facilities being raided have also sounded the security alarm. Therefore, when selecting locations for overseas bases, in addition to the needs of escorting and peacekeeping, one must also consider the long-term protection of overseas interests.¹⁶

East China Normal University Professor Shen Dingli argues that the Chinese public expects the government to protect overseas interests and furthermore, he argues that the issue of an overseas base need not be considered taboo: “[Setting up overseas military bases is not an idea we have to shun; on the contrary, it is our right. . . . As long as the bases are set up in line with international laws and regulations, they are legal ones. . . . There are four responsibilities: the protection of the people and fortunes overseas; the guarantee of smooth trading; the prevention of the overseas intervention which harms the unity of the country; and the defense against foreign invasion.”¹⁷ Shen also highlights the utility of overseas bases in protecting these interests, including potential threats against Chinese SLOCs:

When the public discusses overseas military bases they refer to the supply base for the navy escorting the ships cruising in the Gulf of Aden and Somalia. The discussion shows people's enthusiasm in defending the interests of the country. Yet their worries are not the most important reasons for the set up of an overseas military base. It is true that we are facing the threat posed by terrorism, but different from America, it is not a critical issue. The real threat to us is not posed by the pirates but by the countries which block our trade route.¹⁸

The vulnerability caused by China's increasing dependence on imported oil is of particular interest to Chinese strategists. As James Mulvenon writes, “It is no surprise that PLA strategists would view China's dependence on USN [United States Navy] protection of critical SLOCs as a source of frustration and motivation and would therefore seek to develop an independent means of securing key energy supply routes.”¹⁹ Mulvenon notes that this does not necessarily suggest that China will develop a full-fledged blue water navy

to protect its SLOCs unilaterally. Beijing could devise a mixture of strategies and policies including diplomacy, maritime cooperation with countries in the IOR, and enhanced naval capabilities.²⁰ A debate is under way about how China should meet the challenge of protecting overseas interests.

Expanded Missions for the People's Liberation Army Navy

China's expanding international economic interests are almost certain to generate increasing demands for the PLAN to operate out of area to protect Chinese citizens, investments,

Table 1. Notional PLA Missions to Protect Chinese Overseas Interests

Expanded Chinese Interest	Potential Corresponding PLA Missions
Protection of citizens living abroad	Noncombatant evacuation operations, humanitarian assistance/disaster relief, counterterrorism, counterinsurgency, training and building partner capacity, special operations ashore, riverine operations, military criminal investigation functions, military diplomacy
Protection of Chinese property/assets	Counterterrorism, counterinsurgency, humanitarian assistance/disaster relief, training and building partner capacity, special operations ashore, military criminal investigation, physical security/force protection, riverine operations, military diplomacy, presence operations
Protection of Chinese shipping against pirates and other nontraditional threats	Counterpiracy, escort shipping, maritime intercept operations, training and building partner capacity, sector patrolling, special operations ashore, visit, board, search and seizure, replenishment at sea, seaborne logistics, military diplomacy
Protection of sea lines of communication against adversary states	Anti-submarine warfare, anti-air warfare, anti-surface warfare, carrier operations, escort shipping, maritime intercept operations, air operations off ships, helicopter operations, vertical replenishment, replenishment at sea, seaborne logistics operations, military diplomacy, mine countermeasures

and SLOCs. Such tasks could include protection of PRC citizens living and working abroad, of Chinese property or assets on foreign soil, of Chinese shipping from pirates and other non-traditional security threats, and of SLOCs against hostile adversary states. The PLAN could be assigned specific missions to protect those interests (see table 1).

The frequency, intensity, type, and location of operations will determine the military forces necessary and the associated logistics support requirements, with distance from China, size and duration of operations, and combat intensity being especially important drivers of logistics support requirements. Most of these missions would not require PLAN forces to conduct combat operations against adversary states. Accordingly, they have less demanding logistic support requirements, with distance, size, and duration of operations being the main drivers. These less intensive missions are listed in the first three rows of table 1 displayed above.

However, some missions (listed in the fourth row of table 1) necessary for the protection of Chinese SLOCs against adversary states would require the PLAN to be prepared for high-intensity conflict against a modern military in waters far from China. This type of combat operations would impose additional logistic support requirements, including large hospital and healthcare facilities; ordnance storage and distribution; petroleum, oil, and lubricants (POL) storage and distribution; mortuary services; large ship and equipment repair facilities; air traffic control; and other air support facilities and operations.

Historically, such combat operations are best supported by well-developed bases in the vicinity of the operational area. Sustaining the large naval forces needed to conduct major combat operations against a major state in the Indian Ocean would require a sizable logistics support infrastructure. Ships get damaged in combat, so the PLAN would need large and numerous shipyard facilities to repair them. It is possible that the Chinese have a different operations and strategic concept in mind if they are contemplating a major conventional conflict with India—possibly a short, sharp attack intended to shock the Indians into compliance. Nonetheless, two historic data points appear to belie this argument. First, the Chinese are aware of the importance of logistics support and infrastructure for major conventional conflicts such as the Second World War.²¹ During that conflict, the United States established hundreds of shipyards throughout the Asia-Pacific to support the war effort. A considerable amount of writing on this subject emphasizes the importance of strategic rear areas, transportation support, and supplying front lines.²² Second, lessons taken from the Falklands/Malvinas conflict have made the Chinese intimately aware that even limited wars can impose a heavy logistical burden on combatants operating out of area.²³

Major combat operations typically also produce large numbers of casualties, which would require sizeable hospital facilities in mainland China and in a forward location to treat critically and seriously wounded soldiers and sailors. The United States relies on forward medical facilities to stabilize seriously wounded soldiers before transport and also on large hospital facilities in Europe to care for wounded personnel from Iraq and Afghanistan before sending them to the continental United States (CONUS) for additional treatment at Walter Reed National Military Medical Center.

The PLAN would need ordnance resupply, given the high ammunition expenditure rates in major combat operations.²⁴ Ordnance could be transported from depots in China on ammunition ships, but these ships would be vulnerable to submarine and air attacks (as happened with Japan during its Pacific War with the United States). A country cannot rely entirely on air or sea transport over long distances to resupply units engaged in combat. Militaries typically store some ordnance in forward armories so it can be easily accessible and dispensed to combat units. The long distance from China to the Indian Ocean means the PLAN would need an overseas base to store ordnance, especially for submarines and ships with vertical launch tubes that cannot be reloaded at sea.²⁵

In addition, the PLAN would need access to petroleum, oil, other lubricants, and other replenishments to operate away from home ports for long periods. During peacetime, these stocks are available from commercial port facilities. However, during a conflict, the laws of war and customary requirements for neutrality prohibit port facilities or bases in neutral countries from providing support to combatants.²⁶ If such a facility were supplying PLAN forces, it would no longer be considered neutral and therefore would be subject to attack by China's adversaries.

Finally, any military bases and logistics facilities providing support for PLAN combat operations would require protection from air and missile attack. As the history of conventional military conflicts attests, from World War II to the Gulf War, if China was facing a country such as India with significant military capabilities, the PLA would need air bases to provide air cover for naval forces and to defend bases and logistics facilities from attack. The PLA would also want surface-to-air missiles with some ballistic and cruise missile defense capability to protect air bases, naval bases, and logistics facilities from air and missile attack. This all adds up to a substantial military footprint within the territory of a third-party host country.

The bottom line is that if China wants military dominance in the Indian Ocean (which implies the ability to fight and win major combat operations), it would need a much larger navy and a logistics and support infrastructure that far exceeds current capabilities. Even if we

posited the possibility of Chinese use of covert munitions storage and secret wartime access agreements,²⁷ it would be insufficient for sustained combat operations.

Some evidence suggests that even if its international missions do not expand, the PLAN is already having difficulty supporting current missions due to limitations in the available logistics infrastructure. These operational limitations are likely to eventually lead the Politburo Standing Committee and the Central Military Commission to authorize the establishment of some kind of overseas PLA facility. Retired PLAN Rear Admiral Yin Zhuo is an outspoken advocate for overseas bases. Not long after the initial Gulf of Aden deployment in October 2008, he insisted that China consider establishing an overseas base to ease the logistical and supply strain on PLAN forces.²⁸ He noted that multiple 3-month deployments affected PLAN morale and ability to maintain readiness.²⁹ Yin also pointed out that difficulties Chinese sailors confronted in out of area deployments (such as lack of fresh fruits, vegetables, and potable water, problems communicating directly with Beijing, and lack of medical care) would be resolved if Beijing would allow the PLAN to establish an overseas base near its forward operations.³⁰

Then-PLA Chief of General Staff Chen Bingde also highlighted obstacles the PLAN faces while conducting out of area operations. In a May 2011 speech at the National Defense University in Washington, DC, General Chen noted that continued Gulf of Aden counterpiracy deployments would strain the PLAN and “give China great difficulty.”³¹ Chen also stated that China plans to continue these deployments because the missions protect its national interests abroad.³² The PLAN’s operational difficulties in performing current out of area operations, the likely increase in demand for such operations in the future, and other factors such as Chinese public support for overseas bases (see appendix 4) suggest that the PLAN cannot rely indefinitely on commercial facilities alone to support its overseas operations.

Six Alternative Models of Basing: The Deductive Approach

This report explores six possible overseas logistics support models that Chinese civilian and military leaders may consider to support expanded overseas operations: the Pit Stop Model, Lean Colonial Model, Dual Use Logistics Facility, String of Pearls Model, Warehouse Model, and Model USA. Each is defined and discussed below.

The Pit Stop Model. One option is to continue the current PLAN practice of using commercial port facilities to compensate for the lack of overseas bases. Some Chinese scholars and military analysts advocate continued use of commercial ports as “pit stops” to provide basic services such as refueling, provisioning, electrical power, and waste disposal for PLAN surface vessels.³³ One article noted that “[s]uch arrangements are basically a commercial undertaking,

but must be negotiated government-to-government because military forces are involved. Many nations have such arrangements in the region, particularly the Persian Gulf. Chinese sailors coming ashore would basically be treated like tourists, and subject to local law.”³⁴

Some PLAN officers appear content with current ad hoc arrangements supporting the Gulf of Aden deployments.³⁵ Zhang Deshun, then-PLAN Deputy Chief of Staff, stated in 2010, “[w]e have no agenda to set up military establishments” and no need to establish overseas bases.³⁶ Senior Captain Yan Baojian, a South China Sea Fleet commander, indicated that the navy could operate overseas and conduct out of area missions without any bases on foreign soil: “The naval force can work extensively with China’s business operations worldwide for military supplies, in addition to [obtaining materiel from] advanced supply ships.”³⁷ In a 2010 article, retired Rear Admiral Zhang Zhaozhong noted that the commercial use of regular supply points for rest and entertainment, food and water, ship and equipment maintenance, and medical treatment should suffice.³⁸ Zhang argued both the international community and host nations would welcome these kinds of activities because the supply stops support United Nations–mandated missions, and the PLAN boosts the local economy by spending money at commercial facilities.

The Lean Colonial Model. The Lean Colonial network involves specialized bases scattered throughout the world to support colonies. Nations that utilized this model in the 19th and 20th centuries did so to support broader economic and foreign policy objectives rather than to project military power. The model utilizes bases within sailing distance of each other but lacking any fortifications or defenses against seaborne attack. The Lean Colonial Model can advance national commercial interests but cannot support a naval presence strong enough to preserve sovereignty when challenged.

Germany’s Pacific colonies, which at one time stretched from mainland China to just north of Australia and New Zealand, illustrate the Lean Colonial Model. With the exception of the Qingdao port in China, German colonial possessions were initially established by trading companies acting without government support.³⁹ Germany supported these colonies financially, but they were viewed primarily as a source of national pride and prestige.⁴⁰ German colonies developed ports and logistics centers to support commercial operations but did not invest in defensive fortifications or infrastructure to support naval operations. Although equipped with nine ships, the German Asiatic Squadron’s forays from its homeport in Qingdao were infrequent and ill supplied.⁴¹ The squadron’s logistics network was based on contracts with private companies, which greatly limited its operational capacity and range in the event of a conflict.⁴² The German Navy planned to use the squadron to harass British and American ships in the Pacific and to prevent a shifting of assets to the Atlantic rather than to defend German colonies. Within

months after the outbreak of World War I, every German colony in the Pacific was under the control of Australia, New Zealand, or Japan.

Dual Use Logistics Facility. Some Chinese analysts and PLA officers argue that an overseas base would provide improved logistics and supply support to out of area PLAN ships and task forces at lower cost and with greater capability than commercial facilities. The overseas base would be equipped with medical facilities, refrigerated storage space for fresh vegetables and fruit, rest and recreation sites, a communications station, and ship repair facilities to perform minor to intermediate repair and maintenance. In a 2010 interview, retired Rear Admiral Yin Zhou argued that “a relatively stable, relatively solid base for re-supply and repair would be appropriate” to support Chinese ships conducting antipiracy operations in the Gulf of Aden. “Such a base would provide a steady source of fresh fruit, vegetables and water, along with facilities for communications, ship repair, rest and recreation, and medical evacuation of injured personnel.”⁴³

Dai Xu, a former PLA Air Force colonel, argued in 2009 that China “needs to have power adequate to protect world peace before it will be able to effectively shoulder its international responsibilities and develop a good image. The fulfillment of this duty requires a specific supply facility for the provision of support.”⁴⁴ Dai argued that escorting and peacekeeping missions will become regular PLAN missions: “How to execute these tasks in ever wider sea areas with even lower costs and over longer periods of time is bound to become a practical issue that will have to be dealt with by strategic decision-making departments.”⁴⁵ Military analyst Liu Zhongmin echoes these themes: “[H]ow China will develop its overseas bases is a question that we can no longer avoid answering. . . . Since China began to send navy convoys on anti-piracy missions to the Gulf of Aden and the Somali coast in 2008, the lack of overseas bases has emerged as a major impediment to the Chinese navy’s cruising efficiency.”⁴⁶

The String of Pearls Model. The String of Pearls concept emerged from a 2004 Booz Allen Hamilton (BAH) study, “Energy Futures in Asia: Final Report.” The authors argued that if China needed to protect its flow of energy through the Indian Ocean, it could build on its existing commercial and security relationships to establish a string of military facilities in South Asia. At the time, press reports suggested China had contributed to construction of naval bases in Burma, funded construction of a new port in Gwadar, Pakistan, and invested in commercial port facilities in Sri Lanka and Bangladesh. The speculative analysis in the BAH study has come to be accepted in some Indian and U.S. policy circles as a description of China’s actual strategy for its out of area activities.

Considered narrowly as a logistics model, the main difference between the Dual Use Logistics Facility and String of Pearls models lies in the potential for Chinese commercial investments

in port facilities to support higher intensity military and combat operations. Construction of commercial port infrastructure could serve as cover for construction of secret munitions stockpiles and other port infrastructure that could support combat operations. Chinese commercial ties with host countries could potentially translate into secret agreements to allow PLAN access to the facilities in a conflict. Finally, Chinese investments in commercial port facilities (and the resulting expansion in Chinese political influence in host countries) might allow commercial ports to be transformed into full-fledged Chinese military bases at some point in the future.

The November 2004 BAH report marks the first analytic reference to a so-called Chinese String of Pearls strategy. The authors were asked to address the question: “If China were confronted with a vulnerable source of energy supplies and the possibility of the United States cutting off China’s source of energy supplies through its superior navy, what possible strategies would the Chinese pursue and do we see any evidence that this is taking place?” The Booz Allen team did not extensively research Chinese sources to determine Chinese perspectives, but it engaged in educated speculation on strategic responses China might pursue if confronted with a “Malacca Dilemma”⁴⁷ worst-case scenario. The term String of Pearls originated with “unidentified participants of a workshop conducted to support this project.”⁴⁸

The report submitted to the Office of Net Assessment devotes only two pages to the String of Pearls concept. In a section entitled “Sealane Strategy,” the authors note that Chinese activities in Pakistan, Bangladesh, Burma, Cambodia, and the South China Sea suggest that “China is building strategic relationships along the sealanes from the Middle East to the South China Sea in ways that suggest defensive and offensive positioning to protect China’s energy interests but also serve its broader security objectives.” The report states:

participants at the Energy Futures in Asia workshop referred to this set of strategic relationships along the sealanes as China’s ‘String of Pearls.’ . . . These relationships, which have been developing for years, could serve multiple strategic objectives for the Chinese. For example, bolstering its presence in Myanmar and Pakistan hems in India and simultaneously positioning [sic] China to address the vulnerability to its seaborne oil shipments with either defensive or offensive tactics. A sealane strategy positions China to take a more offensive approach to securing its energy resources by threatening to raise the risk premium for other energy consumers. Using its strategic positioning along the sealanes, China could pursue a deterrence strategy if it believed that its energy flows were in danger of being interdicted or threatened by the United States or others.

Such a deterrence strategy “would entail posing a credible threat to any ship in the sealanes, thereby creating a climate of uncertainty about the safety of all ships on the high seas. Whether or not China will have the capacity to pose a credible threat is uncertain and a point of debate; China would require both robust military capabilities and permission from the host countries to allow it to undertake offensive operations from their territories.” The report included a map labeled “China’s Activities Along the Sealanes” that “highlights Gwadar and Pasni, Pakistan; three locations in Myanmar; the potential location of a Kra Canal in Thailand; Woody and Hainan Island in the South China Sea.”

Other defense analysts subsequently adopted the term “String of Pearls,” often treating it as a description of China’s actual strategy rather than speculative analysis. For example, the author of a 2006 report titled “String of Pearls: Meeting the Challenge of China’s Rising Power Across the Asian Littoral” published by the U.S. Army War College’s Strategic Studies Institute asserted:

Each “pearl” in the “String of Pearls” is a nexus of Chinese geopolitical influence or military presence. Hainan Island, with recently upgraded military facilities, is a “pearl.” An upgraded airstrip on Woody Island, located in the Paracel archipelago 300 nautical miles east of Vietnam, is a “pearl.” A container shipping facility in Chittagong, Bangladesh, is a “pearl.” Construction of a deep water port in Sittwe, Myanmar, is a “pearl,” as is the construction of a navy base in Gwadar, Pakistan. Port and airfield construction projects, diplomatic ties, and force modernization form the essence of China’s “String of Pearls.” The “pearls” extend from the coast of mainland China through the littorals of the South China Sea, the Strait of Malacca, across the Indian Ocean, and on to the littorals of the Arabian Sea and Persian Gulf.⁴⁹

The report argued that Chinese efforts to establish a presence in the Indian Ocean are a response to concerns about access to energy shipments from the Persian Gulf:

To sustain economic growth, China must rely increasingly upon external sources of energy and raw materials. Sea lanes of communication (SLOC) are vitally important because most of China’s foreign trade is conducted by sea, and China has had little success in developing reliable oil or gas pipelines from Russia or Central Asia. Since energy provides the foundation of the economy, China’s

*economic policy depends on the success of its energy policy. Securing SLOCs for energy and raw materials supports China's energy policy and is the principal motivation behind the "String of Pearls."*⁵⁰

Considered in terms of logistics and military capability, the String of Pearls Model would offer some advantages. It could be less costly than a dedicated network of overseas military bases, since commercial investments in port infrastructure would generate some economic returns that military bases would not. Commercial investments are less likely to provoke negative international reactions than military bases or base access agreements. This model could also potentially offer a stepping stone toward a future network of dedicated military bases, with commercial investments helping to build the political relationships necessary for countries to provide China with base access or permit Chinese bases on their territory.

The String of Pearls Model would have significant operational drawbacks as well. Commercial port facilities would not offer ammunition storage, prepositioned spare parts for military vessels, or maintenance specialists. They would provide less operational security and be vulnerable to attack in event of a conflict. Even if China were able to covertly preposition military supplies or negotiate secret base access agreements with host countries, Beijing would likely have difficulty securing permission to use such bases to support combat operations against major countries. Some of these operational drawbacks could be overcome by improvements in facilities and port security, but beyond a certain point such improvements would transform commercial "pearls" into overt Chinese military bases.

Warehouse Model. The Warehouse Model developed by the British between the two world wars demonstrates a fifth potential way for a naval power to maintain a fleet far from home. After considering their economic situation and war plans, the British decided a few defensible ports with large oil supplies and fully capable repair facilities were the best method to support naval operations in the Far East. The Royal Navy decided to stockpile oil at its naval base in Singapore rather than upgrading the coal-based infrastructure at smaller ports or investing in a costly tanker procurement program.⁵¹ Singapore was supplied with all the necessary stores and dock facilities to act as the base of operations for the Far East Fleet. Ports west of Singapore were never adequately updated to support major fleet operations.⁵² The Royal Navy relied entirely on oil stores within its main ports. In 1921, the British did not operate a single oil tanker east of the Suez Canal.⁵³ Singapore was chosen due to its location protecting the main SLOC to India and because it was more defensible than alternatives such as Hong Kong. It was expected to be able to hold out for 3 months against superior Japanese forces until reinforcements could arrive from

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Broader Interpretations of the “String of Pearls”

The meaning of the term *String of Pearls* has broadened over time to go well beyond a speculative description of how China might use commercial investments to support naval operations in the Indian Ocean. Some analysts now use the term to refer to any Chinese blue water navy capability developments, any activity the Chinese navy has taken part in outside of the Asia-Pacific Region (for example, the PLAN’s Gulf of Aden deployments), and any efforts China may undertake to ensure continued access to oil and raw materials coming from Africa and the Middle East.

Some assessments assign motives that go far beyond concerns about access to energy and raw materials. One assessment argues: “The ‘String of Pearls’ strategy . . . provides a forward presence for China along the sea lines of communication that now anchor China directly to the Middle East. The question both the United States and India have is whether this strategy is intended purely to cement supply lines and trade routes, or whether China will later use these in a bid for regional supremacy.”¹

Other assessments, especially from Indian think tanks and defense organizations, state unequivocally that the objective of China’s String of Pearls strategy is to dominate the Indian Ocean region. Consider this analysis from the Indian Army’s Centre of Land Warfare Studies:

*China’s strategy to acquire port facilities for its navy in Pakistan, Myanmar, Bangladesh and Sri Lanka, is well known and has been called China’s “string of pearls” policy by western analysts. Beijing’s game plan appears to be to isolate India and dominate the SLOCs from the Indian Ocean to the South China Sea. Notwithstanding that Beijing is actively pursuing initiatives to tie down India in its neighborhood, it lodged protests in May 2006 over a new “quadrilateral” initiative held in Manila between the U.S., Japan, India and Australia.*²

The String of Pearls concept has shaped how many analysts think about China’s activities in South Asia and the potential for the PLA Navy to operate overseas. A Google search for *China* and *String of Pearls* results in almost 300,000 hits. The Congressional Research Service’s periodic assessment of Chinese naval capabilities specifically mentions

the String of Pearls concept as a possible future path for Chinese military operations.³ The String of Pearls was also mentioned in the Department of Defense's *Joint Operating Environment 2008*, which includes a map entitled "The String of Pearls: Chinese political influence or military presence astride oil routes." The map is of China, the Indian Ocean, and the Persian Gulf with areas in South Asia demarcated as potential "pearls."⁴

Supporters of a more expansive String of Pearls concept argue that China's investment and construction of both commercial and military sites in South Asia and broader development of strategic relations in the region are designed to:

- assure access to energy supplies and raw materials coming in from the Middle East and the Persian Gulf
- exert Chinese political influence in the Indian Ocean region
- encircle, dominate, or hem in India
- militarily dominate the Indian Ocean region
- deter the United States, India, or other powers in South Asia from interdicting Chinese shipping coming from the Persian Gulf.

¹ Chris Devonshire-Ellis, "China's String of Pearls Strategy," in China Briefing.com, March 18, 2009, available at <www.china-briefing.com/news/2009/03/18/china%E2%80%99s-string-of-pearls-strategy>.

² Gurmeet Kanwal and Monika Chansoria, "Breathing Fire: China's Aggressive Tactical Posturing," Centre for Land Warfare Studies Issue Brief no. 12, October 2009, 5.

³ Ronald O'Rourke, "China Naval Modernization: Implication for U.S. Navy Capabilities—Background and Issues for Congress," Congressional Research Service report RL33153, October 17, 2012, 43.

⁴ As found in *The Joint Operating Environment 2008: Challenges and Implications for the Future Joint Force* (Norfolk, VA: U.S. Joint Forces Command, November 25, 2008), available at <www.scribd.com/doc/10537915.joe-2008>.

Europe. Britain had two smaller bases located closer to Japan, both of which relied on Singapore as a logistics center.

The Royal Navy's Logistical Model—a few very large bases intended to provide “one stop shopping”—directly led to its naval difficulties during World War II. These ports established British control over critical sea lines of communication, but the vast distances between them made reinforcement extremely difficult during the initial stages of a conflict. The Royal Navy relied too heavily on Singapore and subsidiary bases and neglected the procurement and fielding of the necessary fleet auxiliaries and support ships for afloat logistics and replenishment at sea.⁵⁴ When the British war plan failed and Singapore was captured, other British bases could not be utilized effectively because they were too distant from intended operational areas or lacked the necessary infrastructure.⁵⁵ Furthermore, once one of these mega bases fell, the lack of intermediate logistic centers made staging an offensive operation exceedingly difficult.

The Warehouse Model does have a few distinct advantages. The largest is its low international profile; relying on only a few well-equipped and dispersed bases limits the number of reliable allies needed and reduces the political ramifications of basing troops abroad. This was not a problem for Imperial Britain, but it was a serious consideration for the Soviets, who built a similar naval infrastructure during the Cold War using ports in Egypt, Somalia, and its satellite countries. A second advantage is cost. It is cheaper to build and maintain a few major bases than to develop and maintain a global network of well-equipped bases. Finally, large bases can have defensive capabilities and, if successfully defended, provide an excellent in-theater staging point for offensive operations.

Model USA. International experts consider the U.S. logistics model the most successful method to maintain large-scale military operations abroad. The terrestrial network combines large bases with minor bases/port access agreements to support U.S. naval and air forces and allow for flexible resupply. In addition to established infrastructure, the U.S. Navy currently maintains the largest auxiliary ship fleet in the world. The result is unprecedented capabilities to resupply ships while underway and to support prolonged ground operations from the sea. In addition to more than 30 naval bases and naval support facilities, the U.S. Military Sealift Command has 110 active service ships supporting fleet operations.⁵⁶ The United States currently maintains a significant base operations network in every major ocean and sea and thus possesses a logistics system that can support operations anywhere in the world. The large auxiliary fleet means that the loss of any single base or even a series of bases does not automatically reduce the Navy's operating range or capacity.

The U.S. response to the tsunami that struck the IOR on December 26, 2004, demonstrates the logistic system's flexibility. Immediately after the tsunami struck, the U.S. Air Force quickly

mobilized to create a forward logistics base in Thailand some 8,000 miles from CONUS.⁵⁷ The Air Force transported approximately 24.5 million pounds of supplies over 47 days.⁵⁸ The Navy also contributed greatly to the relief effort. By January 1, 2005, the USS *Abraham Lincoln* (CVN 72) Carrier Strike Group was providing logistical support, along with a Marine Expeditionary Unit that arrived on January 4.⁵⁹ A U.S. Navy hospital ship sailed from San Diego and arrived in waters near Aceh within 2 weeks of the disaster. Forty-nine percent of the fixed wing aircraft, 55 percent of the helicopters, and 25 percent of the ships used in the humanitarian relief effort were of U.S. origin.

This flexible logistics system allows the U.S. military to surge troops, supplies, and logistics support quickly and to support operations far from CONUS because it maintains logistics hubs scattered throughout the world. Yet the U.S. logistics model derives its strength mainly from its large auxiliary fleet and airlift capacity. The sheer number of platforms and amount of lift capacity support a wide variety of operations far from U.S. soil.

One major shortcoming of the U.S. logistics model is the high cost of building and maintaining large and complex bases, ports, and ships, making it economically infeasible for less affluent countries. Maintaining a geographically distributed and extensive system of bases also requires immense diplomatic and political capital. Finally, countries that choose to pursue such an extensive and capable logistics network may raise international concerns about potential interventionist ambitions. From a purely military perspective, however, the American logistics model is unrivaled in terms of capability.

The Chinese Foreign and Defense Policy Interest Framework

Which logistics model is China most likely to adopt to support its expanding international interests? Table 2 examines each model against criteria important to Chinese foreign and defense policy interests to assess the likelihood that Beijing will pursue a particular model.

Three of the six logistics support models do not satisfy China's broad foreign policy interests as enunciated by Beijing throughout its history of foreign relations. The Lean Colonial, Warehouse, and USA models all violate two of China's most important foreign policy principles: noninterference in the internal affairs of other countries and not acting like an imperialist or hegemonic power. The Lean Colonial Model is simply not applicable to a postcolonial world of sovereign states. Given China's self-image as a champion of the developing world and a positive alternative to other global powers, it is highly unlikely to pursue models that involve large overseas military bases or extensive networks of facilities on the sovereign territory of other states. Beyond the rationale that China is unlikely to

Table 2. Assessments of Chinese Logistics Models and International Interests

	Pit Stop	Lean Colonial	Dual Use Logistics Facility	String of Pearls	Warehouse	Model USA
Does not threaten China's "peaceful rise" image	Yes	No	Yes	Yes	No	No
Does not pose a risk to China's relationship with host nation	Yes	Yes	Yes	Yes	No	No
Neighboring countries will not feel threatened	Yes	Yes	Yes	Yes	No	No
Helps China address a wide range of military contingencies	No	No	Yes	Yes	Yes	Yes
Helps China protect its overseas economic interests	No	No	Yes	Yes	Yes	Yes
Relatively inexpensive	No	Yes	No	No	No	No
Satisfies expectations of ordinary Chinese citizens	No	No	Yes	Yes	Yes	Yes
Does not generate excessive friction with the United States	Yes	Yes	Yes	Yes/No	No	No
Protected against external attack	No	No	No	No	Yes	Yes
Does not require large amounts of transportation assets	Yes	Yes	No	No	Yes	No

violate foreign policy principles that it has established as a foundation for its foreign and defense policy behavior, there is an even stronger reason that China will not establish these kinds of overseas bases. They would threaten China's image as a peaceful rising power and could imperil China's future economic growth, if the international community interprets such bases as evidence of malign Chinese long-term intentions.

In contrast, the Pit Stop Model closely conforms to China's foreign policy principles. However, for reasons discussed below, this model is unlikely to support China's national security interests over the long term.

Does the Pit Stop Model Serve Chinese Long-Term Security Interests?

Today's limited out of area PLA operations are consistent with Chinese foreign policy and national security interests. China's policy specifies that it will not set up military bases in other countries. Official policy states that China does not take part in operations far from China's shores except at the invitation of a host country or when mandated by an international organization like the United Nations. China's official overseas basing policy is consistent with efforts to portray China's rise as "peaceful" to the international community. Even given these policy limitations, the PLAN has been able to conduct Gulf of Aden counterpiracy operations successfully since late 2008.

The Gulf of Aden deployment demonstrates that the Chinese military remains at the very nascent stages of out of area combat operations.⁶⁰ For now, the PLAN appears to be content to remain at this stage of low-intensity combat naval force development, which can be supported using only commercial facilities (albeit at a higher cost than other logistics models).

An earlier NDU study on China's out of area naval operations argued that most great powers follow a path of increasingly demanding out of area operations.⁶¹ If China follows this path, it will eventually participate in maritime intercept operations, engage in combat with pirates in the high seas, and continue to escort shipping through pirate-infested waters. China is likely to conduct freedom of navigation operations to keep its sea lines of communication open and could potentially engage in major combat operations to defend or seize disputed territories in the South and East China Seas or to protect natural resources associated with disputed maritime territory. China might also have to conduct SLOC protection operations if an Indian Ocean state such as India decides to threaten Chinese shipping with air, surface, and subsurface forces. Some Chinese government officials and military officers recognize the need to resolve the piracy problem on land, implying that the government could eventually employ special forces or other military assets to deal with that problem.⁶²

All of these missions imply the use of PLA forces to engage in combat with pirates, terrorists, insurgents, and potentially other states. However, there are a number of reasons why a logistics support model that depends solely on commercial facilities cannot support combat operations that result in significant loss of materiel and manpower.

First, a country cannot assure access to commercial facilities during times of conflict.⁶³ For example, during the Civil and Spanish-American wars, Hong Kong and Japan would not allow the U.S. Asiatic Squadron to access commercial port facilities. Second, commercial facilities do not have the capability to support severely damaged warships, mortuary services for soldiers killed in action, and medical attention for large numbers of wounded service members. Severely damaged warships can sometimes be repaired in foreign commercial shipyards, but this could be extremely expensive in the absence of a special arrangement with the host country, and a request could be denied due to political considerations. Even if commercial facilities agree to perform these operations, supporting the PLA Navy would not necessarily be their top priority if other commercial opportunities are more lucrative or the costs of abrogating existing contracts are too high. China cannot assume that foreign commercial port facilities would act against their own commercial interests to support China during a regional conflict.

High Costs of the Pit Stop Model

The high costs associated with an exclusively commercial logistics network will pressure China to pursue a different model, especially if the scope and intensity of PLA Navy out of area operations increase over time. Conversations with PLA officers indicate that using commercial ports to support the Gulf of Aden deployments has been extremely costly and time-consuming. Then-PLA Chief of General Staff General Chen Bingde indicated in May 2011 that the PLA has encountered operational difficulties in sustaining the Gulf of Aden deployment. Chen did not explicitly cite cost, but this was likely one factor.⁶⁴

U.S. Navy logisticians suggest relying solely on commercial facilities can prove extremely costly, especially in wartime. Experts point out that even in operations short of war, there is a direct relationship between conflict intensity and the need for security at ports and other facilities.⁶⁵ Necessary security features might include patrol boats to monitor and patrol harbors; divers to check for saboteurs below the water line; erection of jersey barriers and other fences around the piers serving the ships; and additional security personnel monitoring the gates.⁶⁶ A commercial facility depends on costly private contractors or its own personnel to perform these services. A military facility can perform these functions more efficiently with military personnel. Ship and military equipment repair can also be extremely costly. Although a commercial

facility can repair ships damaged in low-intensity combat, these repair services would be extremely expensive.⁶⁷ The Pit Stop Model is unlikely to remain a viable logistics alternative if the intensity of Chinese military out of area operations increases in parallel with China's expanding global economic, political, and security interests.

The Dual Use Logistics Facility and the String of Pearls: Two Viable Options

This analysis suggests that the Dual Use Logistics Facility and String of Pearls logistics models are most consistent with China's longstanding foreign policy principles and can best support China's expanding overseas economic and security interests. The third section of the study examines the ability of the two models to support the most likely PLAN operations over the next 20 years; the fourth section examines whether the String of Pearls Model could support higher intensity combat operations as part of a long-term effort to dominate the IOR.

Dual Use Logistics Facility versus the String of Pearls: The Inductive Approach

The Dual Use Logistics Facility and the String of Pearls models both appear compatible with Chinese foreign policy principles and with China's long-term overseas interests. Both models would involve the PLA using a mix of commercial and military facilities to project power farther from China's shores. China would need to develop close political and strategic ties with at least some host nations to gain greater access to their commercial and military facilities. Both models would support increased out of area operations to protect China's expanding overseas economic, political, and security interests.

The two models differ in two important respects (other than the site of the bases). First, the Dual Use Logistics Facility Model is not tied to port access in specific countries, while the String of Pearls Model requires China to have good political relations with numerous host countries. The so-called pearls are all associated with specific facilities in specific countries that can be examined. Second, the String of Pearls Model can potentially provide greater logistics support for military and combat operations if overt commercial access arrangements are supplemented with covert prepositioning of munitions and military supplies and secret diplomatic agreements for base access in the event of a conflict.

If China intends mainly to combat nontraditional threats and develop a modest power projection capability to respond to a relatively small-scale overseas contingency, such as a noncombatant evacuation operation (NEO), humanitarian assistance and disaster relief (HA/DR) missions,

low-intensity conflict, counterterrorism, or protection of PRC expatriates, the Dual Use Logistics Facility is sufficient. China could use dual use facilities as forward operating logistics platforms to engage in nontraditional security operations (including special forces operations ashore) to combat terrorists and other threats to China's overseas operations and citizens. However, if China seeks the capability to conduct major combat operations in the Indian Ocean, the String of Pearls Model is more plausible.

This section explores the ability of these two models to support the most likely PLAN operations in the Indian Ocean (excluding major combat operations) by examining the physical characteristics of sites supposedly associated with the String of Pearls and studying the patterns of current PLAN operational behavior overseas. The potential ability of the String of Pearls Model to support the force structure China would need to dominate the Indian Ocean is explored in the next section.

Examining the Physical Evidence for the String of Pearls

In recent years, authors have started to look more critically at the physical evidence for the existence of a Chinese "String of Pearls." One assessment addressed persistent rumors that China has built or is building military bases in Burma. Veteran Burma watcher William Ashton wrote in 1997:

For all the reports on this subject which have appeared . . . few appear to draw on firm evidence or can be traced to reliable sources. Many seem to be based on rumours, speculation or even deliberate misinformation. There has also been considerable confusion over particular places, developments and military capabilities, which has then been recycled by journalists and academics in subsequent articles.⁶⁸

In a 2007 article, "Burma, China and the Myth of Military Bases," Andrew Selth writes, "It seems to have escaped the notice of most observers that at no stage had the existence of a large Chinese SIGINT [signals intelligence] station on Great Coco Island been officially confirmed by any government other than India's, which was hardly an objective observer. This includes the U.S., which has both an interest in China's activities in the Indian Ocean and the means to detect them."⁶⁹ After an in-depth examination of Great Coco Island and Hainggyi Island, both reportedly candidates for China's String of Pearls, Selth found no physical evidence of a military facility on these islands:

*Great Coco Island has no sheltered harbor or facilities capable of handling a ship of any size. There was only a small pier there until 2002, when the berthing facilities on the island were reportedly expanded. The airstrip, while apparently extended some time after 1988, was also vulnerable to the region's poor weather. Similarly, neither the hydrography nor the topography of Hainggyi Island lent themselves to the construction of a maritime facility of any size.*⁷⁰

Selth concludes that “it would appear that there are a number of small maritime surveillance sites scattered around the Burmese coastline, including on Great Coco Island, some of which may have discreet intelligence functions. Much of the equipment at these sites is likely to have been provided by China, as part of the deals struck between Rangoon and Beijing after 1988.”⁷¹

Another assessment casts a skeptical eye on Gwadar, another String of Pearls candidate site:

*The Gwadar deep-sea port is a case in point. The state-owned China Harbour Engineering Company, funded with a \$198 [million] Chinese loan, has helped Pakistan complete the first stage of this project for a major Pakistan port near the entrance to the Persian Gulf at the mouth of the Straits of Hormuz. It does indeed have a strategic significance as the possible terminus of a land route from western China and central Asia to the Indian Ocean, which would have considerable economic significance. But there seems little or no evidence that a naval base facility is part of the package, or indeed that China has any current intention or capacity to maintain an Indian Ocean fleet for which Gwadar could be a base. The same applies to the other civil engineering and commercial projects in the region which are quoted as evidence for the String of Pearls thesis, from Cambodia to Sri Lanka.*⁷²

Other analysts have pointed out that, with the exception of the special case of Pakistan (discussed below), “government officials in the respective ‘pearl’ countries have openly repudiated reports they have given China any preferential treatment and that Beijing is quietly building and/or planning to build military bases in their sovereign territories.”⁷³ Bangladesh’s Prime Minister Sheikh Hasina claimed that the Chittagong port was “part of her government’s strategy to connect Bangladesh to the greater Asian region in order to develop its markets and promote economic growth in the interests of the people of that country.”⁷⁴ Sri Lanka initially proposed the Hambantota port modernization project to India in 2005 but was turned down by New

Delhi. Sri Lanka subsequently obtained agreement from Beijing to finance eight infrastructure projects, including the Hambantota project, in 2007.⁷⁵

Pakistan is the one country that may be interested in offering its territory as a potential site for a Chinese overseas base. In May 2011, Pakistan's defense minister caused an uproar in the region when he announced that Pakistan had asked China to build a naval base at Gwadar and that the request had been clearly conveyed to the Chinese.⁷⁶ The Chinese government immediately issued a flat denial that China had any intention of constructing military bases in Pakistan.⁷⁷ The issue of Gwadar as a potential base for Chinese military operations recently regained further currency with the announcement that Port Singapore Authority (PSA)—the Singapore company originally appointed by the Pakistan government to manage the port of Gwadar—no longer plans to play that role and that a Chinese firm will eventually take over operations.⁷⁸ The fact that a Singaporean company was running day-to-day operations at Gwadar made Chinese use of the port as a covert military facility highly unlikely, but even the news that a Chinese firm will be taking over operations makes the possibility only slightly more plausible. One of the primary reasons that PSA has withdrawn from the project is that Pakistan has failed to provide some of the long-term infrastructure and logistical support features necessary to make the port successful—factors that also make it unlikely to serve as a “pearl.”⁷⁹

Several sites in the Indian Ocean are of significant interest to Chinese companies and may have some military utility. But is the PLA using these facilities to support operations in the Indian Ocean?

Operational Patterns of Behavior: Current PLAN Overseas Logistics Support

A second way to examine the relative merits of the Dual Use Logistics Facility and the String of Pearls Models is to analyze current PLA operational patterns of behavior. All militaries prepare for operations by rehearsing missions before they perform them, by cooperating with allies and other partners that would be involved in joint operations, and by surveying the geographic landscape, terrain, and areas they expect to operate in.

Some Western observers argue that China has already proven it intends to develop overseas basing and facilities because it currently utilizes an overseas basing network to support its Gulf of Aden deployments.⁸⁰ Figure 1 represents China's Gulf of Aden overseas basing network. Daniel Kostecka, an analyst with the U.S. Navy staff, points out that “[t]he existence of this support network can be seen in the ports in the Indian Ocean where the PLAN has quietly called. The list of these ports is an indicator of not only where the

Figure 1. PLA Navy Ports of Call in Support of the Gulf of Aden Counterpiracy Task Force



PLAN prefers to replenish its ships and rests its crews but also of where it is likely to develop formal arrangements should it choose to do so.”⁸¹ In contrast to the claims of String of Pearls advocates, the current Chinese overseas access network does not overlap with “pearl” candidate sites at all. Instead, the PLAN has operated out of ports such as Salalah, Aden, Djibouti, and Karachi.

Table 3 presents PLAN port visits during the first eight Gulf of Aden counterpiracy deployments. There have been additional task force rotations since this assessment was conducted in mid-2013, but an examination of subsequent visits reflects similar patterns, with no use of the String of Pearls candidate ports to support PLAN counterpiracy operations.⁸²

Table 3. PLAN Gulf of Aden Ship Port Visits

Port	Number of Visits	Dates	Deployment Number	Support Activity	Longest Visit (days)
Salalah, Oman	10	6/21/09 8/14/09 1/2/10 4/1/10 6/8/10 8/10/10 10/11/10 1/19/11 1/28/11 4/10/11	2 nd 3 rd 4 th 5 th 5 th 6 th 6 th 7 th 7 th 8 th	Food, perishables, diesel fuel, water, liberty	10
Djibouti	6	1/24/10 5/3/10 9/13/10 9/22/10 12/24/10 2/21/11	4 th 5 th 6 th 6 th 6 th 7 th	Food, perishables, water	5
Aden, Yemen	10	2/21/09 4/25/09 7/23/09 9/28/09 10/24/09 2/5/10 3/14/10 5/16/10 7/26/10 10/1/10	1 st 1 st 2 nd 3 rd 3 rd 4 th 4 th 5 th 6 th 6 th	Food, perishables, water, diesel fuel	5
Colombo, Sri Lanka	1	1/11/10	4 th	Goodwill	3
Abu Dhabi, UAE	1	3/25/10	5 th	Goodwill	
Jedda, Saudi Arabia	1	11/27/10	6 th	Goodwill	5
Karachi, Pakistan	1	3/13/11	8 th	Goodwill	
Alexandria, Egypt	1	7/26/10	5 th	Goodwill	5
Cochin, India	1	8/8/09	?	Goodwill	3

Table 3. PLAN Gulf of Aden Ship Port Visits (cont.)

Rangoon, Burma	1	8/29/10	5 th	Goodwill	?
Al Manmah, Bahrain	2	9/9/10 12/9/10	6 th	Goodwill	?
Dar Es-Salaam, Tanzania	1	3/26/11	7 th	Goodwill, military exchange	5

Sources: Daniel J. Kostecka, "Places and Bases: The Chinese Navy's Emerging Support Network in the Indian Ocean," *Naval War College Review* 64, no. 1 (Winter 2011); Li Jianwen and Mo Xiaoliang, "Chinese 'Zhoushan' Warship Berths at Port of Djibouti," *PLA Daily*, February 22, 2011, available at <http://eng.mod.gov.cn/DefenseNews/2011-02/22/content_4226259.htm>; "Escort Fleet of the Chinese Navy Began Visit to South Africa," *Chinese-Embassy.org*, April 6, 2011, available at <www.chinese-embassy.org/eng/zngx/t812975.htm>; Liu Yiwei and Hourui, "Chinese Warship Berths at Port of Salalah," *PLA Daily*, April 12, 2011, available at <http://eng.mod.gov.cn/DefenseNews/2011-04/12/content_4236914.htm>; Andrew S. Erickson and Austin M. Strange, *No Substitute for Experience: Chinese Antipiracy Operations in the Gulf of Aden*, Chinese Maritime Studies, Number 10 (Newport, RI: U.S. Naval War College, 2013).

The two ports visited most frequently by PLAN ships were Salalah in Oman and Aden in Yemen. Salalah appears to serve as a "catchall" relief site for PLAN ships deployed to the Gulf of Aden and is used to replenish food, water, and fuel and also for liberty calls. Nearly every PLAN Gulf of Aden task force has visited Salalah during its deployment.

PLAN ships visited Aden 10 times, making it one of the most frequently visited ports. However, only one type of PLAN ship has visited Aden: comprehensive supply ships. The supply ships replenish their food, water, and diesel fuel and then provide replenishment-at-sea services to other ships in the PLAN Gulf of Aden Task Force. This operational pattern closely mirrors U.S. Navy operational patterns in the Persian Gulf, suggesting that the PLAN studied and applied U.S. naval concepts of operation. That the port of Aden also happens to have been the port in which the USS *Cole* was attacked by al Qaeda in 2000 is probably not lost on PLA Navy planners. Thus, the operational pattern of sending a single replenishment ship to Aden and having it replenish other ships not only mimics the U.S. pattern of behavior but is also a prudent force protection measure.

PLAN Gulf of Aden task forces have also used Djibouti to replenish naval supplies. A number of militaries, including the U.S. Navy, regularly visit Djibouti to stock up on food, other

perishables, and water when deployed on counterpiracy operations in the Gulf of Aden. The multinational nature of the facility means that PLAN ships and personnel frequently interact with U.S., European Union, Japanese, and Korean naval personnel at this site, providing opportunities for ad hoc cooperation.

The PLAN has conducted port visits before and after Gulf of Aden deployments, including visits to Cochin, India; Alexandria, Egypt; Colombo, Sri Lanka; Dar Es-Salaam, Tanzania; Abu Dhabi, United Arab Emirates; Jeddah, Saudi Arabia; and Karachi, Pakistan. The PLAN did not replenish naval supplies during these visits, which were port calls to bolster Chinese diplomatic relations with the host country. These visits likely involved liberty calls for Chinese crewmembers.

Chinese resupply activities are mostly conducted on a commercial basis. China and the host governments do not sign memoranda of agreement or negotiate a status of forces agreement covering visiting Chinese sailors. Chinese commentators describe PLAN port visits as similar to a visit by a tourist cruise ship. The host nation provides the ships “hotel services” and expects the sailors to aid the local economy through “tourist” activities. The local Chinese embassy or consulate negotiates agreements for PLAN ships to use facility water, food, and fuel. The Chinese embassy or consulate also arranges to have spare parts flown in by commercial air so that crews may conduct minor or intermediate repairs to ships and helicopters.

This exclusive reliance on commercial port access is unlikely to persist. Recent reports suggest that the PLAN is considering using the Seychelles as a port of operations for Gulf of Aden deployments. Seychelles Foreign Minister Jean-Paul Adam indicated in September 2012 that his country has invited China to set up a military presence.⁸³ Subsequent Chinese press reports indicated that the PLAN was considering the option to use the Seychelles to support logistics and supply efforts for PLAN counterpiracy task forces. This news adds credence to the argument that the PLAN will move from exclusive reliance on commercial ports (the Pit Stop Model) and reach agreements with host nations to use their military facilities (the Dual Use Logistics Facility Model).⁸⁴

What do these observations indicate about the viability of the String of Pearls Model versus the Dual Use Logistics Facility Model? First, there is no evidence that the Chinese are currently conducting military activities at any of the String of Pearls sites. To date, PLAN Gulf of Aden task forces have not used or visited a single String of Pearls site. Second, transactions between the PLAN and host countries providing support for PLAN Gulf of Aden operations have been commercial in nature. These ports have only provided “hotel services,” replenished supplies,

and served as liberty sites for visiting PLAN ships. Finally, the number of PLA forces and units involved in out of area activities has been very limited. None of this evidence supports assertions that the Chinese intend to deploy enough forces in the Indian Ocean area to dominate the region or engage in major combat operations with any of its neighbors.

There is little physical evidence to suggest China is constructing or investing in port facilities in other countries to prepare for future combat operations against India or other countries in the region. Continued PLAN heavy reliance on commercial port facilities—mostly in countries that would likely be neutral if China and India engaged in a shooting war—would create significant vulnerabilities in a conflict. If China were in fact preparing for major conflict, it would likely negotiate with a politically reliable host nation and revisit a single military base repeatedly to accustom its forces to working with an ally in a familiar operating environment.

Could the String of Pearls Support Major Combat Operations?

This part of the study explores the arguments of those analysts who believe China intends to use the commercial port facilities and political relationships associated with the String of Pearls to encircle India and dominate the Indian Ocean. Such an objective would require China to have sufficient forces and an associated logistics support infrastructure to conduct major combat operations in the Indian Ocean. The analysis identifies the forces China would need to dominate the IOR and the other activities China would need to undertake to support this objective.

Base Construction for Combat Operations

If China decided to try to encircle India or dominate the Indian Ocean, Chinese military planners would have to expect a potential conventional military response from India, the largest military power in South Asia. If China accepts this risk and decides to build military facilities in the String of Pearls to support this objective, planners would have to take projected Indian military capabilities into account.

An examination of India's air order of battle alone suggests that this would be a very risky proposition. India has a variety of aircraft within range of all the String of Pearls sites, including older MiG-23s and more modern Su-30s and Mirage 2000s. None of these ports are covered by effective integrated air defense systems, which make PLAN or PLA assets stationed there vulnerable to air attack. Although the PLA could station mobile surface-to-air (SAM) sites to defend String of Pearls facilities (as they did in North Vietnam during the Vietnam War), SAMs would provide little or no defense against India's conventional ballistic missiles.

Stationing military assets, particularly naval assets, at vulnerable String of Pearls sites would also divide Chinese military forces in the event of a conflict. The String of Pearls sites would be a long way from Chinese waters. Assuming the ability to pass through the Strait of Malacca and Strait of Lombok, the PLAN's most modern destroyers would require more than 6 days to sail from Gwadar to the southernmost Chinese ports (151 hours at 29 knots; see appendix 1 for distances). Stationing significant numbers of military assets far from China would make them unavailable to defend the Chinese mainland against other potential adversaries, including the United States and Japan. In order for it to deploy large portions of its naval and air assets so far from its territory, China would have to be confident that other parties would not enter a conflict between China and India and that hostilities would remain confined to the Indian Ocean.

The naval forces required to actually do what String of Pearls adherents claim China is attempting—to encircle India and to militarily dominate the Indian Ocean—would constitute an enormous naval force that would cast great doubts on Chinese claims of “peaceful development.” A prudent naval planner in Beijing would conclude that the PLAN would need to deploy a force at least as large as the Indian Navy to dominate the Indian Ocean. Appendix 2 lists the current and projected (2020) Indian naval order of battle. A Chinese navy seeking to dominate the IOR in 2020 would need at least 3 aircraft carriers, 32 surface combatants, and 21 submarines in addition to the forces necessary to handle non-Indian Ocean missions. If China's current naval force structure (see appendix 2) represents the force needed to meet local maritime security needs, then the PLAN would need a force structure equivalent to both the 2013 PLAN and the 2020 Indian navy to conduct both missions. China's naval force structure would have to be much larger than it is today to address the PLAN current defense mission and a projected Indian Ocean campaign.

A new generation of Indian strategic analysts observes that the String of Pearls might not actually make sense from China's point of view. For example, Iskander Rehman argues in “China's String of Pearls and India's Enduring Tactical Advantage” that:

[B]y virtue of India's immense geographical advantages in the region, it is difficult to imagine China ever being able to wield as much military clout in the region as India can. India's natural peninsular formation means that it has been described by some as akin to an 'unsinkable aircraft carrier' jutting out into the Indian Ocean. Any naval task force venturing into the Bay of Bengal with hostile intentions would have to contend with India's air force and naval

aviation, operating not only from the mainland, but also from the Andaman and Nicobar archipelago in the Andaman Sea, whose airstrips are currently being extended, and which is slated to eventually host Sukhoi squadrons, and possibly MiGs and Mirages.⁸⁵

Rehman adds:

China's naval presence in the region will be dispersed along the several, often distant nodal points that constitute its string of pearls. Assuming that these forces together are superior in both quantity and quality to the Indian Navy, which is, all in all, most unlikely, India will still have the immediate advantage of force concentration and hence superiority if it decides to conduct a rapid strike at an isolated group of Chinese vessels. A direct attack on a naval base would be highly undesirable, as it would trigger a severe crisis with the hosting country. A massive naval deployment outside one such base could have the desired effect however, by compelling the Chinese to de-escalate their land assault, much as the Indian Navy's stationing of its fleet 13 nautical miles outside Karachi during the Kargil war prompted, some claim, the Pakistan Army to accelerate the withdrawal of its forces from the disputed islands.⁸⁶

String of Pearls and Major Combat Operations

As already noted, the PLAN does not currently make use of any of the candidate String of Pearls sites to support counterpiracy operations in the Gulf of Aden. Any commercial port has some military utility. However, the question is whether supposed String of Pearls ports at the Coco Islands, Hambantota, Chittagong, and Gwadar are capable of supporting PLAN major combat operations in the Indian Ocean.

This question can be answered by identifying the physical features necessary to use a facility to conduct major combat operations. The U.S. Department of Defense (DOD) and Department of Transportation apply a standard set of criteria to characterize military port facilities used to support major U.S. combat operations.⁸⁷ These criteria are listed in the left column of table 4. Comparison of these criteria with the physical characteristics of the PLAN naval base at Zhanjiang indicates that Chinese military port facilities are designed and constructed to meet very similar standards. (See appendix 3 for the detailed comparison.)

Table 4. U.S. DOD Port Requirements Applied to String of Pearls Candidatess

Requirements	Gwadar		Hambantota		Chittagong		Coco Islands	
	2012	2035	2012	2035	2012	2035	2012	2035
Recommended infrastructure								
Three berthing spaces 1,000 linear feet each		X		X	X	X		
Minimum water depth of 35 feet	X	X	X	X				
30–45 acres of open storage	X	X		X	X	X		
Four rail offloading spurs of 1,000 feet of straight track each								
Four rail/truck end ramps					X	X		
Gatehouse/security	X	X	X	X	X	X		
Access to port-owned interchange yard to support switching two trains per day					X	X		
Suitable area to land/service helos (~5 acres)	X	X		X	X	X		
Two container handlers	X	X	X	X	X	X		
Adequate interior roadways to port facilities		X		X	X	X		
Office space with adequate utilities and communication service	X	X	X	X				
Processing area for 30 trucks		X			X	X		
Wash rack that meets USDA requirements								
<i>Terminal Access</i>								
Close proximity (<10 miles) to interstate highway system		X		X	X	X		
Access to at least one major commercial rail carrier		X		X	X	X		
Water channel access width of 500 feet and depth of 35 feet	X	X		X	X	X		
Access to commercial rail interchange yard (if port-owned facilities are inadequate)		X		X	X	X		

Sources: Gwadar Port Authority Web site, available at <www.gwadarport.gov.pk/portprofile.html>; “Development in Port Hambantota,” Sri Lanka Port Authority Web site, available at <www.slpa.lk/port_hambantota.asp?chk=4>; Shirajiv Sirimane, “H’tota Port Project Ahead of Schedule,” *Sunday Observer* (Sri Lanka), March 7, 2010, available at <www.sundayobserver.lk/2010/03/07/fea01.asp>; Chittagong Port Authority Web site, available at <<http://portal.cpa.gov.bd>>; “Bangladesh to Build Second Naval Base in Chittagong,” Xinhua News Agency, August 9, 2005, available at <http://english.peopledaily.com.cn/200508/09/eng20050809_201204.html>; “Bangladesh Offered China to Use the Chittagong Port as a Commercial Outlet,” Reuters, March 15, 2010, available at <<http://gurumia.com/2010/03/15/bangladesh-offered-china-to-use-the-chittagong-port-as-a-commercial-outlet/>>; Cocos Islands on Google Maps, available at <www.google.com/maps/place/Coco+Islands/@14.118519,93.37626,8z/data=!3m1!4m7!1m4!3m3!1s0x3091a3008390fbaf:0xbc796b23fe024f25!2sCoco+Islands!3b1!3m1!1s0x3091a3008390fbaf:0xbc796b23fe024f25>.

Table 4 compares the current (2012) and projected (2035) physical features of String of Pearls candidate sites with the DOD port criteria. With the exception of Chittagong port in Bangladesh, the candidate String of Pearls sites all fall far short of what DOD considers minimally acceptable to support major combat operations. Projected improvements by 2035 may give some of the candidate sites additional capabilities to support military operations, although these improvements are intended to support expanded commercial activities. Of note, the port in the Coco Islands does not meet any of the DOD criteria. While Chittagong currently satisfies most of the DOD criteria, and Gwadar and Hambantota might do so at some point in the future, all three of these ports are located close to India and would be highly vulnerable to attack.

This examination finds little evidence to support the claims of String of Pearls advocates that Chinese investments in port facilities in the Indian Ocean reveal a Chinese intention to encircle India or dominate the Indian Ocean militarily. China would require a much larger navy to conduct such operations, and it would make little strategic sense to station the bulk of that force so far away from Chinese territory. Major combat operations would require logistics and support capabilities that go well beyond what commercial ports could provide. Covert ordnance facilities could expand the capability of commercial ports to support some combat operations, but sustained major combat operations would require bases and the defensive military forces necessary to protect them from attack. Such a logistics infrastructure would be an overt string of Chinese military bases, not a covert String of Pearls. Although the long-term development plans for some of these port facilities would improve their capability to support combat operations (if planned facility improvements materialize), they are in locations highly vulnerable to attack

Figure 2. “String of Pearls” Sites



by India. If China does plan to dominate the Indian Ocean militarily, a major and sustained buildup of its naval forces is likely to be a better indicator of that intention than Chinese investments and construction in commercial port facilities in South Asia.

From a strategic point of view, a continued powerful U.S. and Indian military presence in the Indian Ocean makes China unlikely to attempt to dominate that region. If the United States enters into a rapid economic and military decline and India does not successfully modernize its military forces, then a substantial PLAN presence in the Indian Ocean might become a game changer for Chinese strategic influence in South Asia. However, India is likely to continue to develop and modernize its military, and the United States is unlikely to withdraw from the region in the foreseeable future.

Additional Considerations for a PLAN Logistics Base

The preceding analysis suggests that the Dual Use Logistics Facility Model is the logistics support model that best suits future PLAN needs. This part uses interviews with U.S. military logisticians and analysis of Chinese writings to identify likely characteristics of a potential Chinese overseas logistics base.

Interviews with Military Logisticians

U.S. military logisticians have extensive experience supporting forward deployed forces in peacetime and wartime situations. This section draws upon interviews with staff of the National Defense University's Center for Joint and Strategic Logistics and with Navy logisticians with experience at the U.S. Navy Logistics Force Western Pacific or Commander, Logistics Group Western Pacific (LOGWESTPAC) in Singapore to obtain a more detailed sense of the functions and activities the PLAN might perform at overseas logistics facilities.

The interviews focused on logistics support considerations for the missions the PLAN is most likely to perform and therefore did not examine logistics requirements for major combat operations against a major power. Likely missions include presence and military diplomacy missions, counterpiracy operations, maritime intercept operations, HA/DR, NEOs, SLOC protection by escorting Chinese shipping, and possibly counterterrorist operations on land using special forces troops. Such operations would support Chinese overseas interests without threatening the United States or other countries in the Indian Ocean. The logistics and basing infrastructure necessary to support such operations could also help project Chinese power and influence into the Persian Gulf, the Indian Ocean, and the African continent—regions of considerable interest to China. The PLAN can support these operations with modest bases and

logistical support facilities instead of a robust network of military bases that may appear threatening to countries in the region.

Interviewees were asked what a Chinese logistics network (including bases) to support these missions might look like. One expert suggested that if China would not require a large ground force presence to conduct escort and counterpiracy operations and to provide protection and NEO missions to Chinese expatriates, the bulk of China's overseas missions would be expeditionary in nature and largely seabased.⁸⁸ PLA forces are unlikely to need a large-scale, continuous replenishment effort. A hybrid logistics support network or Dual Use Logistics Facility Model that mixes commercial and military facilities is entirely workable for such missions.⁸⁹ This basing model also emphasizes commercial contracts to support a Chinese military facility, cooperative development and use of a partner military's logistics support capabilities, and continued positive economic and political engagement with the host nation.⁹⁰

Spare Parts: Warehousing or a Distribution Network? Logistics experts noted the difficulty in determining which ship or aircraft parts will break before their expected service life is over. However, the PLAN would not necessarily need to store large numbers of spare parts for ships and aircraft in warehouses. An alternative is to develop robust and redundant distribution networks to quickly move spare parts where they are needed. Experts suggested a Chinese network might look less like solid lines of control between specific locales and a few suppliers, and more like a spider web of connections between local Chinese embassies/consulates, China-based PLA logistics facilities, and various overseas and China-based suppliers, husbanding agents, and contractors.⁹¹ This spider web model could also support some combat operations if resupply aircraft and ships could travel into the combat zone. Naval experts noted that with technician access to the ship or aircraft in question plus the availability of most spare parts by expedited delivery services, most parts can be replaced even during wartime, with the exception of submarine and aircraft carrier nuclear reactors.⁹² Most parts can be delivered to a repair facility by ship or airplane.⁹³

For many items, the PLA is likely to follow the U.S. military in avoiding warehousing (parts stockpiled in a forward location) in favor of "stock positioning," which involves contract arrangements with a repair facility or host country to deliver resources to an agreed location at a specific time.⁹⁴ Warehousing might still be required for spare parts that are only produced in China.

Local and Husbanding Agents. Stock positioning and warehousing typically involve the use of local intermediaries or agents who can manage complex logistics transactions. The PLA would need to develop relationships with local agents who could work with DHL, Federal Express, and local logistics assets to move materiel from point A to point B. These local agents

must be able to negotiate and supervise the numerous contracts to provide supplies to PLA units at port.⁹⁵

Light Footprint. With the exception of port calls to provide liberty for sailors, the PLAN will likely keep surface combatants out to sea and send replenishment ships into port to refuel and restock and then replenish the other ships at sea.⁹⁶ The PLAN currently operates this way in the Gulf of Aden. Chinese comprehensive supply ships pull into Aden, replenish food and fuel, and then resupply other members of the counterpiracy task force at sea.⁹⁷ This decreases costs by reducing the number of berths required, limits potential political repercussions of a large Chinese naval presence in port for a prolonged period of time, and reduces risk of casualties in ports subject to terrorist attack.

Division of Labor among Different Logistics Hubs. Logistics experts drew a distinction between logistical support for ships and for aircraft. Air operations require extensive practice, access to an airfield that can handle the type of aircraft being used, that is close to transportation assets, and that has the necessary fuel and maintenance capability. They also require strategic relationships with the host government and key host-nation contractors at the facility. The mechanics and parts needed for aircraft maintenance are reasonably portable, so extensive warehousing of spare parts would not be needed if an effective distribution system is established.⁹⁸ These special requirements suggest that in many instances air logistics support may be provided in a different location than naval logistics support.⁹⁹

LOGWESTPAC experts noted that the PLAN will likely develop a network division of labor, where logistics, supply, and repair functions are distributed among different locations.¹⁰⁰ For instance, damaged U.S. Navy ships are not repaired at Singaporean shipyards but instead sail to Japan, which handles most major ship repairs in the Western Pacific.¹⁰¹ Conversely, the Singapore command maintains a strong web of connections and relationships with local contractors and husbanding agents and thus has primary responsibility for logistics arrangements throughout the Asia-Pacific region.¹⁰² LOGWESTPAC only manages shipborne logistics, deferring to its counterpart in Bahrain (Commander, Task Force 53) or to Commander, Fleet Air Western Pacific in Atsugi, Japan, when air logistics support is needed. The PLAN will likely develop similar divisions of labor among the various commercial and military sites that support their operations.

Dual Use Activities. Interviewees noted that most logistics activities are dual use and can be performed by either military or commercial ports or bases. Work force skills used to support commercial activity—such as supply chain management—can also support military activity.¹⁰³ An airfield that supports commercial airliners can also support noncombat military aircraft.¹⁰⁴

The PLA does not need a dedicated military base to install sensitive communications and other equipment (including radars or even weapons systems); most functions can be performed at commercial facilities. However, the PLA would need assured access, including permission to fly Chinese technicians into the host country, use maintenance and repair facilities, and conduct the necessary work on a damaged ship or aircraft.¹⁰⁵

Legal and Political Restrictions. LOGWESTPAC logisticians noted that the command and staff have to work within various political and legal restrictions. Some host countries want a high degree of control over a visiting military's activities on the facility and expect the visiting military to abide by very rigid legal obligations. For example, a host country may refuse a port visit if a request is not cleared 48 hours in advance. Some countries require a 1-week advance notification of a port visit to provide time for flight clearances of technicians being flown in to conduct repairs or install equipment on a ship. Host nations are often politically sensitive about hosting large numbers of military personnel, which encourages operations with a light footprint. Such political restrictions would especially apply in scenarios where a visiting military was involved in a major regional conflict. For example, Singapore might deny port visits and military flights if the United States were engaged in a conflict with China.¹⁰⁶

PLA Overseas Missions and Overseas Logistics Characteristics. Our interviewees also noted that the characteristics and extensiveness of the logistics support network for the PLA will in some part be determined by the missions that the PLA will be expected to perform overseas.¹⁰⁷ If the CCP leadership is essentially satisfied with a more robust version of the PLA counterpiracy mission, the overseas logistics support network would probably be a more definitive and reliable version of what the Chinese navy enjoys today—that is, signed access agreements with some of the countries that the PLAN currently uses for replenishment and supply. If PLA overseas missions include NEOs, HA/DR, and force protection of citizens, the PLA over the long run might attempt to establish permanent basic access to a facility with communications, housing for sailors, medical facilities, rudimentary ship and equipment repair, and replenishment and resupply functions. If the PLA is expected to conduct ground operations ashore in a distant location, the services needed at the facility would probably expand to include vehicle and equipment repair sites, intermediary medical and mortuary services, light prepositioned materiel sites for low-intensity conflicts, an extensive training area for ground troops, and some warehouses for spare parts and sensitive equipment. Finally, if PLAN missions involve an extensive SLOC protection mission, the PLAN would probably seek to establish an extensive network of facilities geographically

dispersed to cover the wide area of the Indian Ocean. Additional features of the PLA overseas facility in this case would probably include large ship repair sites, extensive medical and mortuary services, POL sites, ordnance storage sites, air traffic control services, and other air support facilities and operations. The recent disappearance of Malaysian Flight 370 en route from Kuala Lumpur to Beijing has revealed that the Chinese military realizes that it lacks the capability to maintain situational awareness throughout a vast space such as the Indian Ocean.¹⁰⁸

How Big Would a Chinese Logistics Base Be? Former LOGWESTPAC staffers indicated that their command has about 100 people.¹⁰⁹ Center for Joint and Strategic Logistics experts suggested that the PLAN, with its less experienced personnel, would probably need about 1.5 times more staff, or about 150 personnel.¹¹⁰ Finnair, a commercial air shipping company that performs air supply chain management functions, staffs its Helsinki terminal with 350 people.¹¹¹ A full-fledged Chinese logistics base in Qingdao has a staff of approximately 500 personnel.¹¹² These figures suggest a range of 100 to 500 personnel at a Chinese overseas logistics facility. Chinese scholars and military experts emphasize that PLA activities on a foreign base should be respectful of the wishes and sovereignty of the host country, which suggests that the PLA might try to minimize its footprint. U.S. logistics experts share this view. Considering all these factors, a Chinese overseas logistics support base might have 150 to 200 personnel.

Selection Criteria for the Host Country

Chinese analysts have recently started to specify additional desired characteristics for their overseas facilities. Dai Xu describes the criteria for selecting a specific region and country that should host their overseas facility/facilities:

*We must choose a region where our strategic interests are important and concentrated and then select a country that has a friendly, solid relationship with us. Not only can our overseas commercial fleets obtain timely replenishment once we have this kind of base, but our commercial interests in the countries and regions around our base will also have a stable support point. This type of support can not only encourage domestic enterprises to take further steps toward going global, but can also deepen our friendship with the host countries and promote cooperation on other issues.*¹¹³

Legal Requirements and Political Restrictions

Shen Dingli writes:

*Bases established by other countries appear to be used to protect their overseas rights and interests. As long as the bases are set up in line with international laws and regulations, they are legal ones. But if the bases are established to harm other countries, their existence becomes illegal and they are likely to be opposed by other countries.*¹¹⁴

Shen argues that overseas basing decisions need to balance three relationships:

*First, the relations between base troops and the host countries. It is possible to set up military bases as long as the establishment is in line with the host countries' interests. Second, the relationship between the base troops and the countries neighboring to the host country. If the base troops can maintain regional stability, it will be probably welcomed by all the countries in the region. Third, the relationship between the big countries in the world. The establishment of the troop bases is sensitive to those big countries which have already set up bases abroad.*¹¹⁵

Shaping the International Environment to Accept a Chinese Overseas Base

Military expert Liu Zhongmin argues that:

China also needs to make the international community aware of the fact that overseas bases are needed for two purposes: China's own interests and the country's assumption of more international responsibilities. There is no need to conceal these goals. Some countries expect China to undertake more international responsibilities but object to China's plans for overseas bases, which are necessary for bearing such responsibilities. This is unreasonable.

He urges Chinese policymakers to begin consultations with potential hosts, noting that "China's traditional friendly relations with many coastal nations on the Indian Ocean make it possible

to set up overseas bases there.” Liu notes that Southeast Asian, Middle Eastern, and African countries are not worried about Chinese overseas bases because China does not have a tradition of maritime military expeditions. India is an exception, since it “has competitive relations with China in the Indian Ocean.” Liu argues that consultations and cultivation of support from different international organizations and the global community can overcome obstacles.¹¹⁶

Chinese analysts and military personnel advocating establishment of an overseas military base argue that it should:

- provide essential logistics and supply support for out of area military operations
- conform to international law and the strict restrictions and preferences of the host nation
- support an acceptable Chinese role in the larger regional and international context
- be built in a country or countries that maintain friendly relations with China and whose interests are advanced by a Chinese military presence
- protect Chinese shipping and sea lines of communication against nontraditional and traditional threats, ensure the safety of Chinese citizens and businesses abroad, and deter foreign intervention against Chinese economic interests abroad.¹¹⁷

Staging Points for Nontraditional Missions Ashore

A more speculative argument is the potential for China to establish staging points to supply ordnance, weapons, and other equipment to support ground operations against terrorists, insurgents, and pirates in Africa. Comments by Chinese analysts and by the PLA Chief of General Staff in 2011 suggest Beijing may eventually decide that China’s economic interests in Africa require a ground force presence.¹¹⁸ Special operations against nonstate actors in Africa could be facilitated by a logistics support facility in a friendly country such as Pakistan. Such ground operations would go well beyond the rationales currently offered by advocates of overseas Chinese bases and would likely generate political concerns from African countries.

The PLA might be able to conduct limited ground combat operations without staging ordnance and weapons ashore. China could follow the example of a U.S. Marine Expeditionary Unit (Special Operations Capable) (MEU[SOC]), which deploys a reinforced battalion supported by aircraft and service support assets on board amphibious ships to conduct NEOs, HA/DR operations, and low-intensity combat against terrorists and insurgents. MEU (SOCs) do not

need prestaged equipment to conduct 6-month-long missions. The deployment of China's first landing platform dock to the Gulf of Aden in July 2010 with PLA special forces on board could have been the initial test of such an operational concept.¹¹⁹

Characteristics of a Future Chinese Overseas Logistics Base

Interviews with military logisticians and Chinese writings provide insight into the operational and political considerations likely to shape the characteristics, features, and location of a potential overseas PLA logistics base. Pakistan's status as a trusted strategic partner whose interests are closely aligned with China's makes it the most likely location for such a base, but Karachi would be better able to satisfy PLAN requirements than Gwadar. Chinese experts recognize that host nation (and neighboring country) concerns will restrict which operations are possible from an overseas base. Chinese experts also acknowledge the need for a concerted strategic communications plan to gain international support for an overseas base and to dispel international suspicion. U.S. military logisticians suggest that a future Chinese overseas logistics base will likely be dual use in nature, rely on distribution networks rather than warehousing for resupply, have a light footprint of between 100 and 500 personnel, and make heavy use of husbanding agents.

Establishing an overseas base in South Asia would support a range of Chinese overseas interests, but it might also give rise to additional interests. Dr. Rodney Lyons of the Australian Strategic Policy Institute argues that a nation's presence out of area is like gravity—a force that in itself exerts pressure in a certain direction.¹²⁰ Chinese overseas logistics bases would be vulnerable to attack if China conducted major combat operations against India or the United States. But in peacetime, overseas logistics facilities could support a higher tempo of PLAN operations, increase Chinese political leverage in dealing with regional countries, and advance Chinese foreign policy goals. An increased PLA presence in the Indian Ocean would offer both opportunities and challenges for U.S. national security interests.

Conclusion and Policy Implications

This study began by examining China's expanding overseas economic, political, and security interests, which are likely to generate increasing demand for PLAN overseas deployments. The study then identified and analyzed six basing models that the PLA might employ to support such missions. After examining each model in relation to China's long-standing foreign policy principles and long-term interests, the research found two models conform to China's foreign policy principles: Dual Use Logistics Facility Model and String of Pearls Model.

The current commercial Pit Stop Model is unlikely to be able to support the heightened demand for military missions to protect China's expanding international interests. Evidence suggests that even the current tempo of counterpiracy operations and rotations is expensive and is straining PLAN forces. These factors will generate pressure for the PRC leadership to expand access beyond current temporary access to commercial facilities. The Dual Use Logistics Facility and the String of Pearls Model are the two options that conform to China's foreign policy principles and would support likely missions to protect China's foreign policy interests.

To distinguish between these two models, the assessment examined physical evidence of sites associated with the String of Pearls and the patterns of current PLAN operations abroad. There is little physical evidence to suggest that China intends to use commercial port facilities associated with the String of Pearls to support military operations. China's current naval operational patterns of behavior do not involve any of the supposed String of Pearls sites. The PLAN uses commercial facilities to support its Gulf of Aden operations and has not engaged in joint military exercises with the host nations.

The study also explored the view that the String of Pearls indicates a Chinese intention to encircle India and dominate the Indian Ocean. The analysis noted that using the String of Pearls to support major combat operations in the Indian Ocean would require a much larger Chinese naval force structure and that the geography of the region favors India. The analysis also revealed that only Chittagong port in Bangladesh has most of the physical features necessary to support major combat operations. Gwadar and Hambantoto could potentially be upgraded over the next 20 years to improve their capability, but improvements sufficient to support major combat operations would likely transform them into overt Chinese bases. Moreover, it would make little sense for China to conduct combat operations from facilities highly vulnerable to Indian air and missile strikes.

Interviews with U.S. military logisticians and analysis of Chinese writings identified a number of likely characteristics of a potential Chinese overseas logistics base under the Dual Use Logistics Facility model. This information suggested that China would likely position any bases in a country with a longstanding friendly relationship and similar strategic interests (such as Pakistan), that the host country would likely impose restrictions on how China could use the bases, and that China would need an effective strategic communications plan to ensure international support and dispel suspicion. Logistics experts suggested that a future Chinese overseas logistics base will likely be characterized by a dual use nature, reliance on distribution networks for resupply rather than warehousing, a light footprint (between 100 and 500 personnel), a division of labor between logistics hubs, and heavy use of husbanding agents. Chinese logistics facilities could also potentially serve as a staging point for ground operations against nonstate actors.

An expanded PLAN overseas presence will present both opportunities and challenges for U.S.-China strategic and military-to-military relations. Opportunities include expanding the U.S. cooperative military relationship with China to:¹²¹

- enhance cooperation in NEOs, HA/DR operations, and other nontraditional security fields
- enter into discussions with China, India, and other interested parties about multilateral SLOC protection
- allow for cooperation in counterterrorism, force protection, and littoral maritime security
- participate in joint U.S.-China-India naval exercises
- expand opportunities for logistics cooperation (for example, U.S. ships refueling from Chinese underway replenishment ships or in Chinese-run facilities).

Although a Chinese forward presence would remain vulnerable to conventional attacks from India or the United States, China would still be able to exert strategic pressure in the IOR. In this light, the United States should:

- continue strengthening its bilateral security relationship with India
- pursue its own access agreements with countries in South Asia to balance any increased Chinese strategic weight in the region
- increase the frequency and depth of U.S. engagement with potential hosts for PLAN logistics facilities (for example, countries in the IOR, the Persian Gulf, and the Gulf of Aden)
- consider initiating a series of rolling bilateral exercises with Indian Ocean countries modeled after the U.S.-Association of Southeast Asian Nations Cooperation Afloat Readiness and Training (CARAT) exercises and the U.S.-South American UNITAS exercises.

If China establishes a significant forward basing presence, the PLAN will be operating in closer proximity to U.S. forces and U.S. basing arrangements. The United States should:

- continue to emphasize maritime safety issues and operational procedures in its Military Maritime Consultative Agreement discussions with the Chinese
- reach an understanding about U.S. access to facilities in the Indian Ocean where China has access agreements
- consider quid pro quo arrangements between U.S. and Chinese forces for the mutual use of water, fuel, and other interchangeable services.

Finally, if some countries agree to host large-scale PLA bases, this choice would imply a fundamental shift in their relations with the United States. As a consequence, the United States should:

- make clear that it does not support PLAN use of overseas bases to conduct combat operations against other nation-states
- make clear that if the host country allows the PLAN to conduct combat operations from its facilities, the United States would consider the circumstances and might treat the host country as a belligerent. In the event of a conflict with China, the United States would reserve the right to use force against facilities supporting Chinese military operations
- make clear to the potential hosts of PLA bases that the United States will exert diplomatic and financial pressure to ensure that they do not assist China's use of force against another nation-state in the IOR.

A Chinese announcement that the PLA has established an overseas military base or reached a long-term base access agreement in the IOR will present a challenge for U.S. regional policy in South Asia. However, China's increasing presence in the Indian Ocean does not signal an intention to encircle India or to dominate the Indian Ocean. The United States will need to assure other countries that it remains actively engaged in order to balance the political leverage China will gain from a forward presence in the Indian Ocean and encourage China to act responsibly as Beijing seeks to protect its overseas interests.

Appendix 1. “String of Pearls” Distance to Chinese Bases in Nautical Miles

	Sanya		Zhanjiang	
	Point to Point	Linear by Water	Point to Point	Linear by Water
Gwadar	2,656.95	4,392.77	3,054.31	5,280.85
Hambantota	1,816.78	2,676.65	2,221.85	3,300.90
Chittagong	1,028.93	2,746.19	1,198.54	3,365.75
Sanya	N/A	N/A	216.28	300.68
Zhanjiang	216.28	300.68	N/A	N/A

Source: *Jane's Fighting Ships*, available at <http://search.janes.com/Search/documentView.do?docid=/content1/janesdata/yb/jfs/jfs_5719.htm@current&pageSelected=allJanes&keyword=Luyang%2011&backPath=http://search.janes.com/Search&Prod_Name=JFS&>.

Appendix 2. Required PLAN Force Structure for an Indian Ocean Region Conflict

	Aircraft Carriers	Destroyers	Frigates	Submarines
2013 Indian Navy	2	8	13	15
2013 PLA Navy	1	26	53	63
2020 Indian Navy	3	15	24	24
2020 Total Minimum PLAN Force	3	41	77	87

Source: *Jane's Fighting Ships*, available at <http://client.janes.com/Search/documentView.do?docId=/content1/janesdata/sent/sassu/indis130.htm@current&pageSelected=allJanes&keyword=India%20Navy&backPath=http://client.janes.com/Search&Prod_Name=SASS&>.

Appendix 3. U.S. DOD Port Requirements Applied to Zhanjiang

Requirements	Zhanjiang
Recommended infrastructure	Current
Three berthing spaces 1,000 linear feet each	X
Minimum water depth of 35 feet	X
30–45 acres of open storage	X
Four rail offloading spurs of 1,000 feet of straight track each	X
Four rail/truck end ramps	X
Gatehouse/security	
Access to port-owned interchange yard to support switching two trains per day	X
Suitable area to land/service helicopters (~5 acres)	X
Two container handlers	X
Adequate interior roadways to port facilities	X
Office space with adequate utilities and communication service	X
Processing area for 30 trucks	
Wash rack that meets USDA requirements	
<i>Terminal Access</i>	
Close proximity (<10 miles) to interstate highway system	
Access to at least one major commercial rail carrier	X
Water channel access width of 500 feet and depth of 35 feet	X
Access to commercial rail interchange yard (if port-owned facilities are inadequate)	X

Sources: “Port of Zhanjiang: Port of Call,” *WorldPortSource.com*, available at <www.worldportsource.com/ports/portCall/CHN_Port_of_Zhanjiang_2532.php>; “Zhanjiang Port: General Information,” *Sinoagentgd.com*, available at <www.sinoagentgd.com/06Port_11.htm>; Xu Shaohua, “A Rising Port City in South China,” speech given at briefing on Zhanjiang (Guangzhou) Investment Environment, November 5, 2003, available at <www.chinazj.net/daohan/e2003-11-05.htm>.

Appendix 4. Citizen and Netizen Public Opinion on Overseas Basing

Although the ability of public opinion to influence Chinese government policy remains debatable, some evidence suggests the Chinese Communist Party does take Chinese citizen viewpoints into account in determining policy.¹ Polling data suggest the Chinese public has a positive attitude toward overseas bases. In one 2009 poll by *Huanqiu Shibao*, 16,906 (89.6 percent) respondents said “yes” and 1,967 (10.4 percent) respondents said “no” to the question, “Should China Establish Overseas Military Bases?”²

An October 2009 *Huanqiu Shibao* poll asked, “How should China strengthen its effectiveness in protecting Chinese vessels off the coast of Somalia?”³ The construction of an overseas base was suggested by 40.4 percent of respondents; 31 percent advocated increasing the number of navy vessels; 21.2 percent called for increasing the area of protection; and 7.5 percent called for asking for support from international navy forces. The poll also asked: “Focusing on the current situation, what is the most pressing need for the Chinese navy?” Most respondents (32.7 percent) indicated that having a stable, reliable, overseas base was the most pressing need; 30.2 percent called for building an aircraft carrier; 22.8 percent advocated increasing the capacity of medium-sized surface fighter/destroyer vessels; and 14.3 percent called for increasing the number of supply vessels.⁴

Public opinion might not pressure the CCP to establish an overseas base or agree to long-term access agreements. However, this data suggests the views of Chinese citizens would not be an obstacle to establishing a permanent overseas basing network.

¹ Linda Jakobson and Dean Knox, “New Foreign Policy Actors in China,” SIPRI Policy Paper no. 26, September 2010, 44.

² 本期话：中国应该在海外设军事基地吗？[This Week's Topic of Discussion: Should China Establish Overseas Military Bases?], 2010, accessed at <<http://debate.huanqiu.com/2009-12/675394.html>>.

³ 网民呼吁寻求海外基地组航母编队维护远洋利益 [Internet Users' Call for Establishing Overseas Bases and Arrange for Aircraft Carriers to Better Protect Interests Overseas], October 20, 2009.

⁴ Ibid.

Notes

¹ Beginning in 2009, the People's Liberation Army Navy (PLAN) began deploying three-ship flotillas to the Gulf of Aden for the purposes of conducting counterpiracy operations. These missions have largely involved escorting Chinese and other ships through areas known for Somali pirate activity. Up until that point Chinese shipping had been threatened by an increasing number of piracy activities, and the United Nations had authorized the formation of counterpiracy missions by its members.

² See Christopher D. Yung et al., *China's Out of Area Naval Operations: Case Studies, Trajectories, Obstacles, and Potential Solutions*, China Strategic Perspectives 3 (Washington, DC: National Defense University [NDU] Press, December 2010).

³ See Phillip C. Saunders, *China's Global Activism: Strategy, Drivers, and Tools*, Institute for National Strategic Studies Occasional Paper 4 (Washington, DC: NDU Press, 2006).

⁴ Two excellent overviews are David Shambaugh, *China Goes Global: The Partial Power* (New York: Oxford University Press, 2013) and Elizabeth Economy and Michael Levi, *By All Means Necessary: How China's Resource Quest is Changing the World* (New York: Oxford University Press, 2014).

⁵ U.S. Energy Information Administration, "China is now the world's largest importer of petroleum and other liquid fuels," *Today in Energy*, March 24, 2014.

⁶ 2011 China Customs statistics, accessed at Global Trade Information Services, Inc.

⁷ Chinese Ministry of Commerce data, accessed at *CEICData.com*, China Economic and Industry Data Database, May 21, 2014.

⁸ The Heritage Foundation, "China's Global Reach," interactive map, available at <www.heritage.org/research/projects/china-global-investment-tracker-interactive-map>.

⁹ Erica S. Downs, testimony before the U.S.-China Economic and Security Review Commission, hearing on "China's Foreign Policy: Challenges and Players," panel on "New Interest Groups in Chinese Foreign Policy," April 13, 2011.

¹⁰ Mathieu Duchâtel and Bates Gill, "Overseas citizen protection: a growing challenge for China," *SIPRI Newsletter*, February 2012, available at <www.sipri.org/media/newsletter/essay/february12>.

¹¹ U.S. Energy Information Administration, "China," February 4, 2014, available at <www.eia.gov/countries/analysisbriefs/China/china.pdf>.

¹² "China Focus: China ponders energy strategy," Xinhua, February 13, 2014, <<http://english.cntv.cn/20140213/103226.shtml>>; Michael Forsythe, "As U.S. Aims for Energy Independence, China Heads the Opposite Way," *New York Times*, February 13, 2014.

¹³ Andrew Erickson and Gabriel Collins, "China's Oil Security Pipe Dream," *Naval War College Review* 63, no. 2 (Spring 2010), 91.

¹⁴ Daniel Hartnett, "The PLA's Domestic and Foreign Activities and Orientation," testimony before the U.S.-China Economic and Security Review Commission hearing on "China's Military and Security Activities Abroad," Washington, DC, March 4, 2009, 1.

¹⁵ Dai Xu, "China Should Establish Overseas Base," *Huanqiu Shibao*, February 3, 2009, 11, accessed at <<http://mil.huanqiu.com/top/2009-02/363027.html>>.

¹⁶ Ibid.

¹⁷ Shen Dingli, "Don't Shun the Idea of Setting Up Overseas Military Bases," China.org, January 28, 2010, available at <www.china.org.cn/opinion/2010-01/28/content_19324522.htm>.

¹⁸ Ibid.

¹⁹ James Mulvenon, "Dilemmas and Imperatives of Beijing's Strategic Energy Dependence: The PLA Perspective," in *China's Energy Strategy: The Impact on Beijing's Maritime Policies*, ed. Gabriel Collins et al. (Annapolis, MD: Naval Institute Press, 2008), 5.

²⁰ Ibid., 5–10.

²¹ Mi Zhengyu et al., *China's National Defense Concepts* (Beijing: People's Liberation Army Press, April 1988), 200–202.

²² Ibid.

²³ Christopher D. Yung, "Sinica Rules the Waves? The People's Liberation Army Navy's Power Projection and Anti-Access/Area Denial Lessons from the Falklands/Malvinas Conflict," in *Chinese Lessons from Other People's Wars*, ed. Andrew Scobell, David Lai, and Roy Kamphausen (Carlisle, PA: Strategic Studies Institute, 2011), 89–90.

²⁴ Within the U.S. defense analysis literature, there is a long list of studies that support the idea of high ordnance expenditure rates in combat. See, for example, Robert Berg, "The C.N.A. Ordnance Programming Model and Methodology," Professional Paper 424 (Alexandria, VA: Center for Naval Analyses, October 1984), 19; Angelyn Jewell et al., "U.S.S. *Nimitz* and Carrier Airwing Nine Surge Demonstration," CRM 97-111.10 (Alexandria, VA: Center for Naval Analyses, April 1998), 52–64. That the Chinese have absorbed this lesson from their observations of foreign conflicts, see Yung, "Sinica Rules the Waves?" 84–85, and Dean Cheng, "Chinese Lessons from the Gulf Wars," in Scobell, Lai, and Kamphausen, 160.

²⁵ Craig Hooper, "VLS Underway Replenishment: When Will the Navy Get Serious?" DefenseTech.org, June 10, 2010, available at <<http://defensetech.org/2010/06/10/vls-underway-replenishment-when-will-the-navy-get-serious/>>.

²⁶ According to the Hague Convention XIII, neutral nations must provide a belligerent "24-hour . . . notice to depart . . . neutral ports or roadsteads at the outbreak of armed conflict. . . . Belligerent vessels, including warships, retain a right of entry in distress whether caused by force majeure or damage resulting from enemy action . . . [however] [i]n the absence of special provisions to the contrary in the laws or regulations of the neutral nation, belligerent warships are forbidden to remain in a neutral port or roadstead in excess of 24 hours." See U.S. Navy, U.S. Marine Corps, U.S. Coast Guard, *The Commander's Handbook on the Law of Naval Operations*, Edition 2007, 7–2.

²⁷ This report specifically addresses the likelihood of this prospect later in the report as it addresses the possibility of a "String of Pearls" option being pursued by the Chinese military.

²⁸ 尹卓：中国海军应在吉布提建立长期补给基地 [Yin Zhuo: The Chinese Navy should establish a long-term base at Djibouti], accessed at <http://cn.chan.cn/article/n494656,fe393f,d2477_12053.html>.

²⁹ Ibid.

³⁰ Ibid.

³¹ Chen Bingde, "Forging a New China-U.S. Military-to-Military Relationship Featuring Mutual Respect, Mutual Benefit, and Cooperation," speech at National Defense University, Washington, DC, May 18, 2011.

³² Ibid.

³³ By “hotel-like” or “tourist-like,” we mean naval operations that are stripped largely of their military content. “Hotel services” of commercial ports essentially involve refueling, restocking of foodstuffs, water replenishment, provision of electric power, and management or discarding of waste. Such activities are essentially indistinguishable from commercial port services to non-military vessels.

³⁴ “Logistics: Chinese Warships Fill Indian Ocean Ports,” StrategyPage.com, July 9, 2010, available at <www.strategypage.com/htm/htlog/articles/20100709.aspx>.

³⁵ By ad hoc, we mean an arrangement that does not involve a status of forces agreement, a formal memorandum of understanding or agreement, or a signed legal document specifying the nature of the relationship between the visiting Chinese military and the host nation.

³⁶ Cui Xiaohuo, “Navy has no plan for overseas base,” *China Daily*, March 11, 2010.

³⁷ Ibid.

³⁸ Zhang Zhao Zhong, “Will China Establish Overseas Military Bases?” *China ThinkNet*, January 26, 2010.

³⁹ W.O. Henderson, “Germany’s Trade with Her Colonies, 1884–1914,” *The Economic History Review* 8, no. 1 (1938), 7.

⁴⁰ Hermann Hiery, *The Neglected War: The German South Pacific and the Influence of World War I* (Honolulu: University of Hawaii Press, 1995), 1.

⁴¹ Ibid.

⁴² Ibid., 11.

⁴³ “China Navy Official Says Overseas Base Needed,” *Asiancorrespondent.com*, December 30, 2009, available at <<http://asiancorrespondent.com/26981/china-navy-official-says-overseas-base-needed/>>.

⁴⁴ Dai, 11.

⁴⁵ Ibid.

⁴⁶ Liu Zhongmin, “Overseas Bases Needed For Much More Than Cruising Sailors,” *Global Times*, May 21, 2010, available at <www.globaltimes.cn/content/533918.shtml>.

⁴⁷ The term *Malacca Dilemma* was first used by former General Secretary of the Chinese Communist Party Hu Jintao at an economic work conference in 2003. He noted that China’s dependence on oil coming from the Middle East would be vulnerable to certain powers who seek to control navigation through the Strait of Malacca. See Shi Hongtao, “Energy Security Runs Up against the ‘Malacca Dilemma’: Will China, Japan, and Korea Cooperate?” *China Youth Daily*, June 15, 2004, as referenced in Marc Lanteigne, “China’s Maritime Security and the ‘Malacca Dilemma,’” *Asian Security* 4, no. 2 (May 2008).

⁴⁸ Communications with the Office of Net Assessment, November 30, 2011. The subsequent quotes for this paragraph and the next are drawn from communications with the Office of Net Assessment about the Booz Allen Hamilton report.

⁴⁹ Christopher J. Pehrson, “String of Pearls: Meeting the Challenge of China’s Rising Power Across the Asian Littoral,” Strategic Studies Institute, U.S. Army War College, July 2006, 3.

⁵⁰ Ibid., 5.

⁵¹ James Neidpath, *Singapore Naval Base and the Defence of Britain's Eastern Empire, 1919–1941* (New York: Clarendon Press, 1981), 53.

⁵² Chris Madsen, “Strategy, Fleet Logistics, and the Lethbridge Mission to the Pacific, and Indian Oceans 1943–1944,” *Journal of Strategic Studies* 31, no. 6 (2008), 961.

⁵³ Neidpath, 55.

⁵⁴ *Ibid.*, 953.

⁵⁵ *Ibid.*, 963.

⁵⁶ Military Sealift Command, “About Military Sealift Command,” available at <<https://sealift-command.com/about-msc/>>.

⁵⁷ Otto Kreisher, “Operation Unified Assistance,” *Air Force Magazine* 88, no. 4 (April 2005).

⁵⁸ *Ibid.*

⁵⁹ “Navy Logistics Supports Operation Unified Assistance,” *The Navy Supply Corps Newsletter* (March/April 2005), 3.

⁶⁰ Yung et al., *China's Out of Area Naval Operations*, 38–40.

⁶¹ *Ibid.*

⁶² Zhang Yuwei, “Fight Somalia Pirates on Land, China Tells the UN,” *China Daily*, March 11–13, 2011.

⁶³ According to *The Commander's Handbook on the Law of Naval Operations*:

all acts of hostility in neutral territory, including neutral lands, neutral waters, and neutral airspace, are prohibited. A neutral nation has the duty to prevent the use of its territory as a place of sanctuary or a base of operations by belligerent forces of any side. If the neutral nation is unable or unwilling to enforce effectively its right of inviolability, an aggrieved belligerent may take such acts as are necessary in neutral territory to counter the activities of enemy forces, including warships and military aircraft, making unlawful use of that territory.

See *The Commander's Handbook on the Law of Naval Operations*, 7-2.

⁶⁴ Chen.

⁶⁵ Author interviews with Captain Ronald Carr, Commander Brian George, and Commander William Clarke, all members of the OPNAV N4 staff with experience at Logistics Force Western Pacific in Singapore.

⁶⁶ *Ibid.*

⁶⁷ *Ibid.*

⁶⁸ William Ashton, “Chinese Bases in Burma—Fact or Fiction?” *Jane's Intelligence Review* 7, no. 2 (July 1997), as cited in Andrew Selth, “Burma, China and the Myth of Military Bases” in *Asian Security* 3, no. 3 (2007), 300.

⁶⁹ Selth, 300.

⁷⁰ *Ibid.*, 301.

⁷¹ Ibid., 302.

⁷² Stephen Marks, "Understanding China's Strategy: Beyond 'Non-Interference,'" in *Pambazuka News*, November 05, 2008, available at <www.pambazuka.org/en/category/books/51762>.

⁷³ Billy Tea, "Unstringing China's Strategic Pearls," *Asia Times*, March 11, 2011, available at <www.atimes.com/atimes/China/MC11Ad02.html>.

⁷⁴ Ibid.

⁷⁵ Ibid.

⁷⁶ Peter Lee, "China Drops the Gwadar Hot Potato," *Asia Times*, May 28, 2011, available at <<http://atimes.com/atime/China/ME28Ad01.html>>. Also see Farhan Bokhari and Kathrin Hille, "Pakistan Turns to China for Naval Base," *Financial Times*, May 22, 2011, available at <www.ft.com/cms/s/0/f50629b6-81a7-11e0-8a54-00144feabdc0,dwp_uuid=4d9dd3aa-5fbd-11dc-b0fe-0000779fd2ac.html>.

⁷⁷ Lee.

⁷⁸ "China May Take Over Gwadar Port from Singaporean Firm," *International Herald Tribune*, September 1, 2012, available at <<http://tribune.com.pk/story/429443/china-may-take-over-gwadar-port-from-singaporean-firm/>>; also see "Gwadar Goes to China," *International Herald Tribune*, September 1, 2012, available at <<http://tribune.com.pk/story/429152/gwadar-goes-to-china/>>.

⁷⁹ "China May Take Over Gwadar Port from Singaporean Firm."

⁸⁰ Daniel J. Kostecka, "Places and Bases: The Chinese Navy's Emerging Support Network in the Indian Ocean," *Naval War College Review* 64, no. 1 (Winter 2011), 65.

⁸¹ Ibid.

⁸² For an update of Chinese counterpiracy operations and port visits, see Andrew Erickson and Austin Strange, "No Substitute for Experience: Chinese Antipiracy Operations in the Gulf of Aden," *China Maritime Studies* 10 (November 2013), 140–141.

⁸³ "Seychelles Invited China to Set Up Anti-Piracy Base," *DefenseNews*, September 4, 2012, available at <www.defensenews.com/article/20111202/DEFSECT03/112020302/Seychelles-Invites-China-Set-Up-Anti-Piracy-Base>; also see Jeremy Page and Tom Wright, "Chinese Military Considers New Indian Ocean Presence," *Wall Street Journal*, December 14, 2011, available at <<http://online.wsj.com/article/SB10001424052970203518404577096261061550538.html>>; "China's Seychelles Facility Not a Military Base: Chinese Analysts," *FirstPost*, December 13, 2011, available at <www.firstpost.com/print-page.php?idno=155082&sr_no=0>.

⁸⁴ Li Xiaokun and Li Lianxing, "Navy Looks at Offer from Seychelles," *China Daily*, December 13, 2011.

⁸⁵ Iskander Rehman, "China's String of Pearls and India's Enduring Tactical Advantage," Institute for Defence Studies and Analyses, June 8, 2010, available at <www.idsa.in/idsacomments/ChinasStringofPearlsandIndiasEnduringTacticalAdvantage_irehman_080610>.

⁸⁶ Ibid.

⁸⁷ Department of Defense, *Engineering and Design of Military Ports: Unified Facilities Criteria*, UFC 4-159-02 (Washington, DC: Department of Defense, January 16, 2004), 3-1-3-4, 7-1-7-2, 8-1-8-3, 12-1-12-6, 13-1-13-2.

⁸⁸ Interview with COL George Topic, USA, (Ret.), Vice Director, Center for Joint and Strategic Logistics, National Defense University, March 16, 2011.

⁸⁹ Ibid.

⁹⁰ Ibid.

⁹¹ Ibid.

⁹² Ibid.

⁹³ Ibid.

⁹⁴ Ibid.

⁹⁵ Ibid.; interview with OPNAV N4 staff members with experience working out of Singapore.

⁹⁶ Interviews with Carr, George, and Clarke.

⁹⁷ Ibid.

⁹⁸ Interview with Topic.

⁹⁹ Ibid.

¹⁰⁰ Interviews with Carr, George, and Clarke.

¹⁰¹ Ibid.

¹⁰² Ibid.

¹⁰³ Interview with the Center for Joint and Strategic Logistics, January 2010. This point was reiterated in a later interview with Topic.

¹⁰⁴ Ibid.

¹⁰⁵ Interviews with Carr, George, and Clarke.

¹⁰⁶ Ibid.

¹⁰⁷ Ibid.

¹⁰⁸ Greg Torode and Michael Martina, "Search for MH370 Reveals a Military Vulnerability for China," Reuters News, April 22, 2014.

¹⁰⁹ Interviews with Carr, George, and Clarke.

¹¹⁰ Interview with Topic.

¹¹¹ "Finnair Cargo Terminal Operations," FINNAIR.com, available at <www.finnaircargo.com/en/terminal-operations/about-us.html>.

¹¹² Zeng Sheng et al., "Focus on Highlights of Qingdao Support Base's Military-Civilian Integrated Support Training Exercise Under Informatized Conditions," *Renmin Haijun*, December 3, 2010, 3 (in translation).

¹¹³ Dai.

¹¹⁴ Shen.

¹¹⁵ Ibid.

¹¹⁶ Liu.

¹¹⁷ The analysts and military scholars cited here, while notably more hawkish than the average Chinese commentators on issues related to defense, have nonetheless tended to espouse views that generally reflect government policy or are within the range of government debates over policy. It should be noted that one of these scholars—Admiral Yin Zhuo—when considered by the CCP to "speak out of school" was formally reprimanded and forced to make a retraction of his statements.

¹¹⁸ Chen.

¹¹⁹ “Type 071 Yuzhao Class Amphibious Transport Dock (LPD),” Globalsecurity.org, available at <www.globalsecurity.org/military/world/china/yuzhao.htm>. Also see Jeff Engstrom, “PLA’s Growing Force Projection Capabilities,” *China Brief* 10, no. 25 (December 17, 2010), 7-9.

¹²⁰ Comments made at the Institute for National Strategic Studies 2011 Pacific Symposium “The New Security Environment—Implications for American Security in the Asia Pacific Region,” National Defense University, Washington, DC, April 4–5, 2011.

¹²¹ Although the U.S.-China military-to-military relationship has experienced ups and downs over the past few years, there is some evidence that the Chinese would like to develop certain types of cooperation. At the March 2011 PLA National Defense University–U.S. National Defense University Strategic Dialogue in Beijing, China, PLA NDU representatives expressed an interest in having the two militaries conduct joint exercises and lessons learned exchanges related to noncombatant evacuation operations. Similar suggestions were made to State Department representatives at the 2011 Strategic and Economic Dialogue.

About the Authors

Dr. Christopher D. Yung has been a Senior Research Fellow in the Center for Strategic Research, Institute for National Strategic Studies (INSS), at the National Defense University since September 2009. Prior to entering government service, Dr. Yung was a Senior Research Analyst at the Center for Naval Analyses, where he led projects or was involved in analysis related to China, Northeast Asia security, the People's Liberation Army and its navy, and U.S. interoperability with the militaries of the Far East. In addition to Dr. Yung's China- and Asia-related expertise, he has direct military operations analysis experience. Between 1998 and 2001, he was the Special Assistant and Operations Analyst for the Commander, Amphibious Group Two—the senior U.S. Navy amphibious command in the Atlantic Fleet. This was followed by an assignment as Special Assistant and Operations Analyst for the Commander, U.S. Marine Corps Forces Atlantic—the highest ranking Marine Corps operational command on the East Coast. Dr. Yung holds a Ph.D. in International Relations from the Paul H. Nitze School of Advanced International Studies at The Johns Hopkins University. He also holds an MA in East Asian and China Studies from the same institution. He received language certificates in Mandarin Chinese from Columbia University and the Beijing Foreign Language Teacher's Institute.

Mr. Ross Rustici was a Research Analyst in INSS. His areas of expertise include U.S.-Chinese strategic relations, cyber, and the People's Liberation Army, as well as PLA Navy operations, force sizing, and defense transparency. Mr. Rustici holds MA degrees in International Relations and Public Administration from the Maxwell School of Syracuse University.

Mr. Scott Devary was a Research Intern in INSS. He holds an MA in International Relations and Diplomacy from Seton Hall University and a BA in Political Science from the University of Washington. He studied Mandarin Chinese at Tsinghua University in Beijing. Mr. Devary has been a Contract Researcher in the Center for Global Security at the Department of Energy and Brookhaven National Laboratory.

Ms. Jenny Lin is the Founder of Asia Taktik, LLC. She was a Salzburg Fellow and Sasakawa Peace Foundation Resident Fellow in the Pacific Forum at the Center for Strategic and International Studies. She simultaneously held research contracts at The Project 2049 Institute and INSS. Her research focus includes the U.S.-Japan alliance and China's energy, military, cyber, and space industries. Ms. Lin received an MA in Public Policy from the American University and BA in Government and Asian Studies from the University of Texas at Austin. She is fluent in Mandarin and Min Nan dialect.

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